AUDIO INTEGRATING - DESCRIPTION AND OPERATION

1. General

A. The audio integrating system provides a means of selecting and monitoring the audio outputs of the communication receivers, navigation receivers, and interphone amplifiers. In addition, the audio integrating system provides a means of directing microphone inputs to the communication transmitters and interphone amplifiers. Electrical power is supplied by the 28 vdc emergency buses.

B. The audio integrating system consists of audio control panels, microphone selector panels, headsets, microphones, jack outlets and receptacles, loudspeakers, control switches, and the audio integrating amplifier.

C. The audio control panels control the audio integrating system. A control panel is located at each flight crew station and each panel contains audio control knobs, aural navigation selector switches, a marker receiver switch, a microphone selector switch, interphone volume control, isolation resistors, isolation and speaker amplifiers, a microphone control relay, and transmitter indicating lamps.

D. The audio control knobs select and adjust the audio outputs of the communication receivers and the navigation receivers. The aural navigation selector switches select the audio outputs of the automatic direction finder receivers in voice, range, or both audio outputs. The marker switch selects the audio output of the marker receiver. The microphone selector switch provides the control for directing microphone audio outputs to the transmitters and interphone amplifiers, for directing the audio outputs of the interphone amplifiers and sidetone from the transmitters to the headsets and loudspeakers, for directing mode control to the transmitters, and for directing 28 vdc to the transmitter indicating lamp. The interphone volume control adjusts the output level of the audio integrating and service interphone amplifiers. An isolation resistor is in series with each audio input to the audio control panel to prevent interference between flight crew stations. The signal loss caused by the resistors is regained by amplification of audio by the isolation and speaker amplifiers. The isolation and speaker amplifiers are connected in parallel to all audio inputs to the control panels. The isolation amplifier output is connected to the associated station headsets and jack outlets, and the speaker amplifier output is connected to the associated station loudspeaker. The microphone control relay is energized whenever an associated station push-to-talk switch is actuated and connects microphone audio outputs and transmitter mode control to the microphone selector switch. The transmitter indicating lamps come on to indicate the selected transmitter circuit breaker is closed.

E. Microphone selector panels are installed at the captain's, first officer's, and the flight engineer's stations and contain a microphone selector switch and a pendant switch. The selector switch selects the boomset microphone or the oxygen mask microphone audio outputs and directs the audio to the audio control panels, or directs the oxygen mask microphone audio output to the passenger address amplifier. Depressing the pendant switch pushbutton energizes the microphone control relay in the associated station audio control panel and mutes the associated station loudspeaker.

F. The headsets provided for the flight crew and the observer are the conventional headsets and boomsets. The conventional headsets are installed at the navigator's and observer's stations. The boomsets, consisting of a headset and boom microphone, are installed at the captain's, first officer's and flight engineer's stations.

G. The microphones provided for the flight crew and the observer are the boomset microphones, oxygen mask microphones, and the hand microphone. The boomset microphone is a dynamic microphone which requires additional amplification. The boomset amplifier is an integral part of the boomset jack outlet. The oxygen mask microphones are installed at each flight crew station and at the observer's station. The captain's and first officer's mask microphones push-to-talk switches are installed in the outboard horn of each control wheel. The flight engineer's, navigator's and observer's mask microphones contain integral push-to-talk switches. A hand microphone is installed at the navigator's station and is accessible to the observer. The hand microphone contains an integral push-to-talk switch.

H. The jack outlets and receptacles provided for the headsets and microphones are the amplifier jack outlets, conventional headset jack outlets, oxygen mask microphone jack outlets, hand microphone receptacle, pendant switch receptacles, and handset jack outlet. The amplifier jack outlets are installed at the captain's, first officer's and flight engineer's stations for boomset installation. Each amplifier jack outlet consists of an amplifier box and a base plate. The amplifier box contains the boomset jack outlet, audio amplifier, gain control, and an electrical connector. The amplifier box is mounted on the base plate by two attaching screws. The gain control and electrical connector are inserted through mounting holes provided in base plate and are secured with lockwashers and nuts. The base plate also contains the amplifier jack outlet mounting holes. The mounting holes are aligned with the nutplates installed in the airplane structure. The conventional headset jack outlets are installed at the flight crew stations and the observer's station. The navigator's and observer's conventional headset jack outlets are connected in parallel. The oxygen mask microphone jack outlets are installed at each flight crew station. The captain's and first officer's mask microphone jack outlets are not wired for push-to-talk control. The hand microphone receptacle is installed between the navigator's and observer's stations to provide either, access to the hand microphone. The pendant switch receptacles are installed at the navigator's and observer's stations and are wired for microphone push-to-talk control only. The hand microphone

receptacle and pendant switch receptacles are connected in parallel. The handset jack outlet is installed in the nose wheel well to provide ground to flight compartment communications. The handset jack outlet is connected to the audio integrating amplifier through a relay which is actuated when the handset plug is inserted into the jack outlet.

I. Loudspeakers are installed at the captain's and first officer's stations. Each loudspeaker contains a transistorized audio amplifier, volume control, muting relay, and a speaker. The volume control is external and adjusts the loudspeaker output level. The muting relay is energized by the associated station push-to-talk switch and mutes the speaker to prevent feedback to the microphone. All of the components contained in the loudspeaker are mounted on the front cover panel and a perforated back cover is provided for component cooling and protection. Electrical connections are made through a receptacle mounted on the back cover.

J. A microphone control switch is installed on the outboard horn of each control wheel. Actuation of the control wheel switch energizes the audio control panel microphone relay and mutes the associated station loudspeaker. The audio integrating amplifier provides the necessary audio amplification for flight crew communications and is installed in the inboard radio rack on shelf 1. The amplifier contains an input transformer, input gain control, transistorized audio amplifier, and an output transformer. The amplifier input and output are connected to the audio control panels and the nose wheel well jack outlet. A screwdriver access hole is provided through the amplifier chassis to adjust the input gain control. Electrical power is applied by closing the flight engineer's circuit breaker on the left emergency bus. Electrical connections are made through a receptacle mounted on the rear of the chassis.

2. Operation Audio Integrating

A. For interphone operation, the microphone selector switch is set to the interphone position and a microphone control switch is pressed. The audio control panel microphone relay is actuated and microphone audio is routed through the microphone relay and directed by the microphone selector switch to the amplifier and amplfied. Amplified audio is routed to the audio control panels and through the interphone volume control to the microphone selector switch. The microphone selector switch directs the audio through the isolation resistor and amplifiers to the headsets and loudspeaker.

B. For transmitter operation, the microphone selector switch is set to the transmitter position and a microphone control switch is pressed. The audio control panel microphone relay is actuated and microphone audio and transmitter mode control are routed through the relay and directed by the microphone selector switch to the transmitter. The selected transmitter frequency is modulated by the audio and the transmitter output is sampled for sidetone. Sidetone is routed to the audio control panels to the microphone selector switch. The microphone selector switch

directs the sidetone through the isolation resistor and amplifiers to the headset and loudspeaker.

C. For monitor operation, the communication and navigation receiver audio outputs are routed to the audio control panels. The audio control knob is set to a forward position and the audio is routed through an isolation resistor, audio control knob potentiometer, and amplifiers to the headset and loudspeaker.

3. To Operate Audio Integrating

A. To Operate Interphone

(1) Energize electrical buses.

(2) Place controls to position indicated.

Control	Position
Microphone selector panel switch	Boom normal
Audio control panel microphone selector switch	Flight interphone
Interphone volume control	Mid position
Microphone push-to-talk switch	Depressed

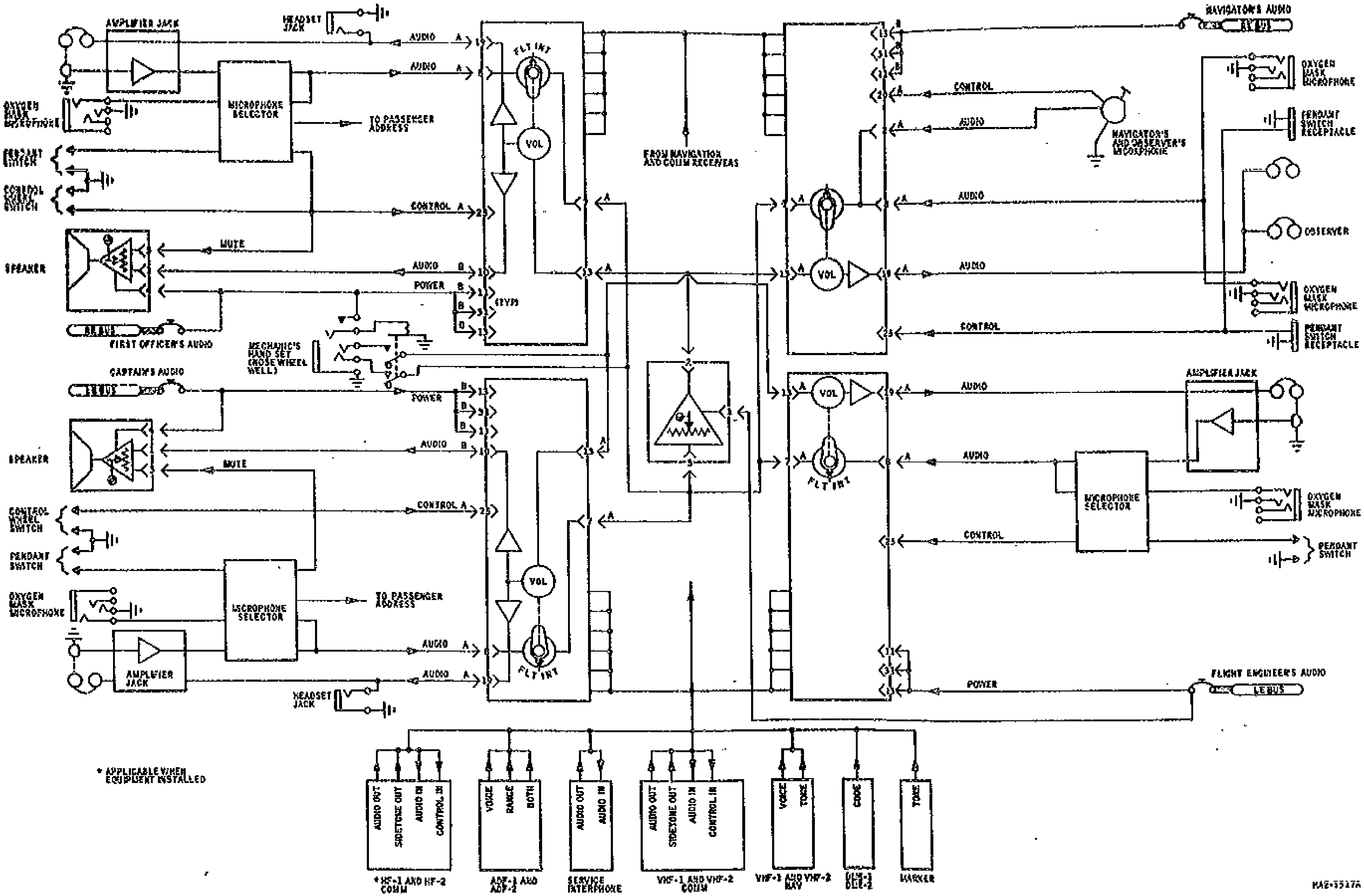
(3) Speak into microphone with normal tone and adjust interphone control to satisfactory level.

B. To Operate Transmitter

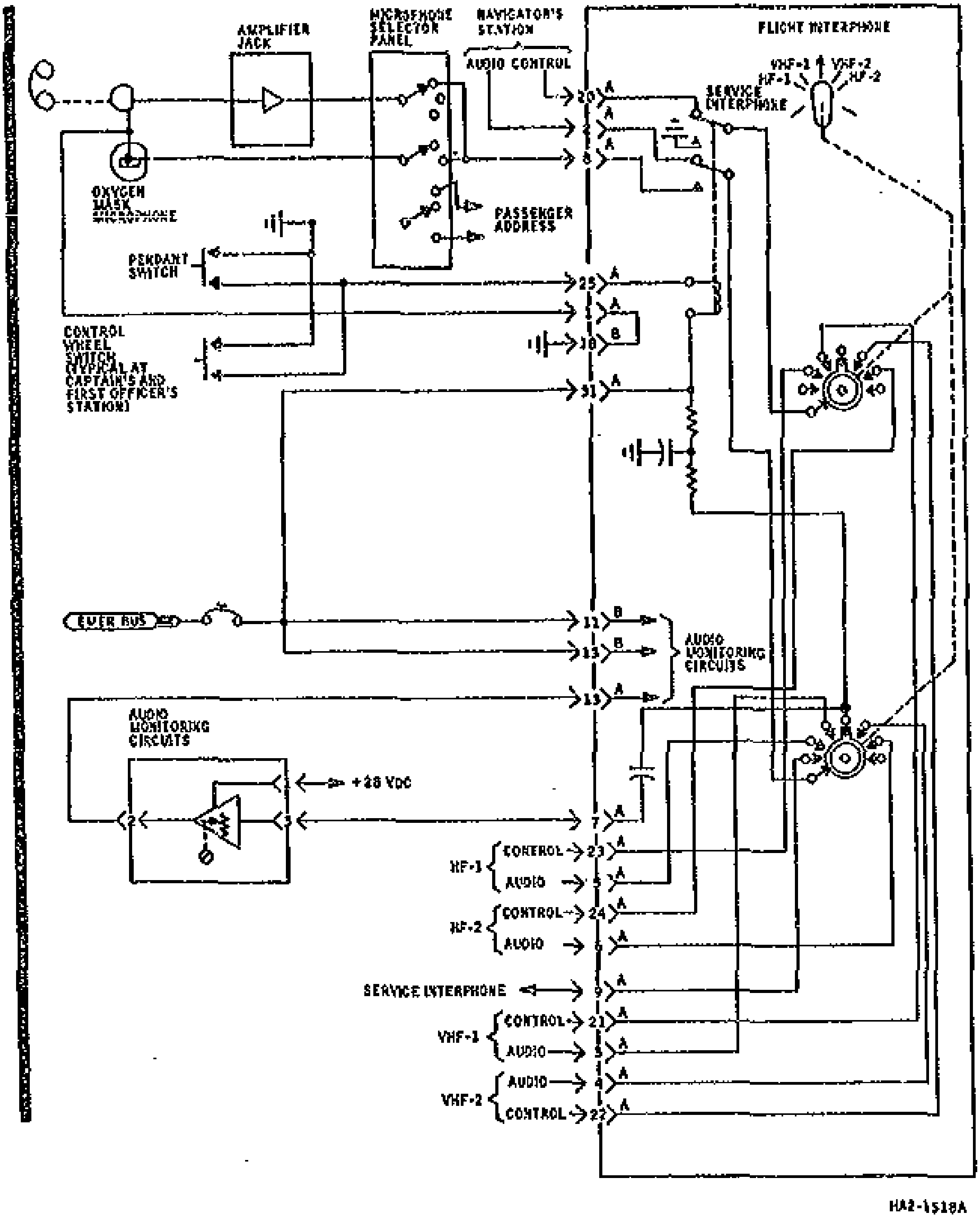
(1) Energize electrical buses.

(2) Place controls to position indicated.

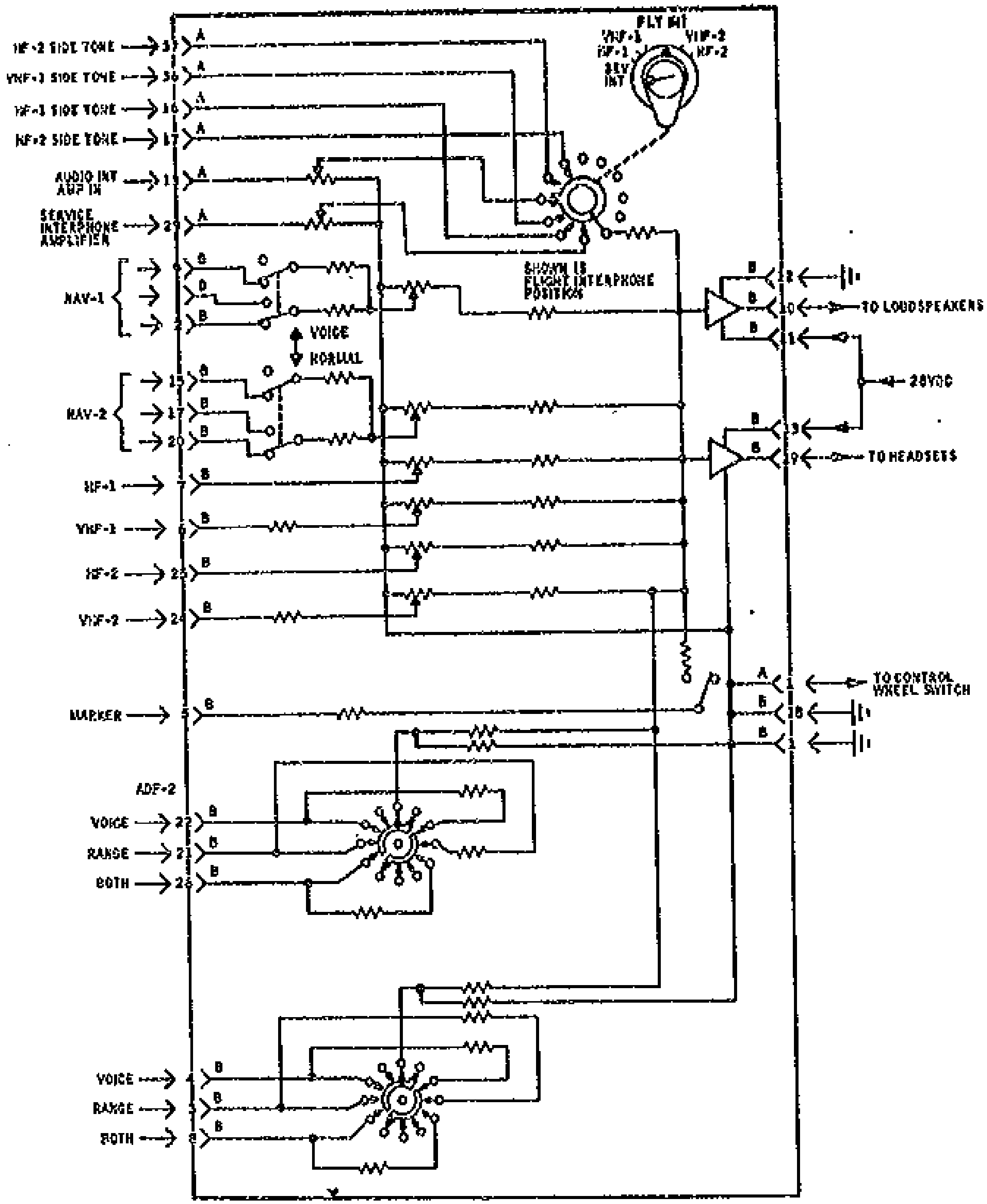
Control	Position
Microphone selector panel switch	Boom normal
Audio control panel microphone selector switch	Desired transmitter
Audio control panel audio control knob	Mid position
Microphone push-to-talk switch	Pressed



Audio Integrating -- Simplified Schematic
Figure 1



Audio Control Panel Audio and Control Circuits --
Audio Integrating Simplified Schematic
Figure 2



HA2-1519A

Audio Control Panel Audio Monitor Circuits --
Simplified Schematic
Figure 3

C. To Monitor Communication and Navigation Receivers

(1) Energize electrical buses.

(2) Place communication and navigation receiver audio control knobs to a forward position and navigation receiver switches to on position.

AUDIO INTEGRATING - DESCRIPTION AND OPERATION

1. General

   A. The audio integrating system provides a means of selecting and monitoring the audio outputs of the communication transceivers, navigation receivers, audio integrating amplifier, and passenger address amplifier and the selection and control of microphone outputs to the communication transceivers and to the audio integrating amplifier. In addition, the audio integrating system provides ground to flight crew communications.

   B. The audio integrating system consists of audio control panels, conventional and boom microphone headsets, microphones, jack outlets, microphone relays, control switches, audio amplifier, and loudspeakers. (See Figure 1.)

   C. The audio control panels control the audio integrating system. A control panel is provided at each flight crew station and each control panel contains audio control knobs, aural navigation switches, microphone selector switches, isolation resistors, isolation amplifier, filter switch and an audio filter, and the microphone selector switch internal lamps.

   D. The audio control knobs select and adjust the audio outputs of the communication transceivers, navigation receivers, marker receiver, audio integrating amplifier, and passenger address amplifier. The aural navigation switches select the audio outputs of the automatic direction finder receivers. The microphone selector switches select and control the microphone audio outputs to the communication transceivers and to the audio integrating amplifier. An isolation resistor is in series with each audio input to the audio control panel to prevent interference between flight crew stations. The resultant signal loss by the isolation resistors is regained by the isolation amplifier. The isolation amplifier amplifies all audio inputs to the audio control panel. The filter switch selects or bypasses the audio filter and the audio filter reduces the noise level of the audio outputs from the audio control panel.

   E. The conventional headsets provide audio monitoring and a headset is install installed at each flight crew station and at the observer's station. The boom microphone headsets provide speech reproduction and audio monitoring and a boomset is installed at the captain's station and one at the first officer's station. Each headset and boomset is provided with a jack for installation.

   F. The boom microphones, oxygen mask microphones, and the hand microphones, are provided for voice reproduction. All of the microphones are dynamic microphones and require audio preamplification. An oxygen mask microphone is installed at each flight crew station. The mask microphones at the captain's and first officer's station are provided with a connector for installation. The mask microphones at the flight engineer's and navigator's station contain an integral audio preamplifier and push-to-talk switch and are provided with a jack for installation. A hand microphone is installed at each flight crew station and at the observer's station. Each hand

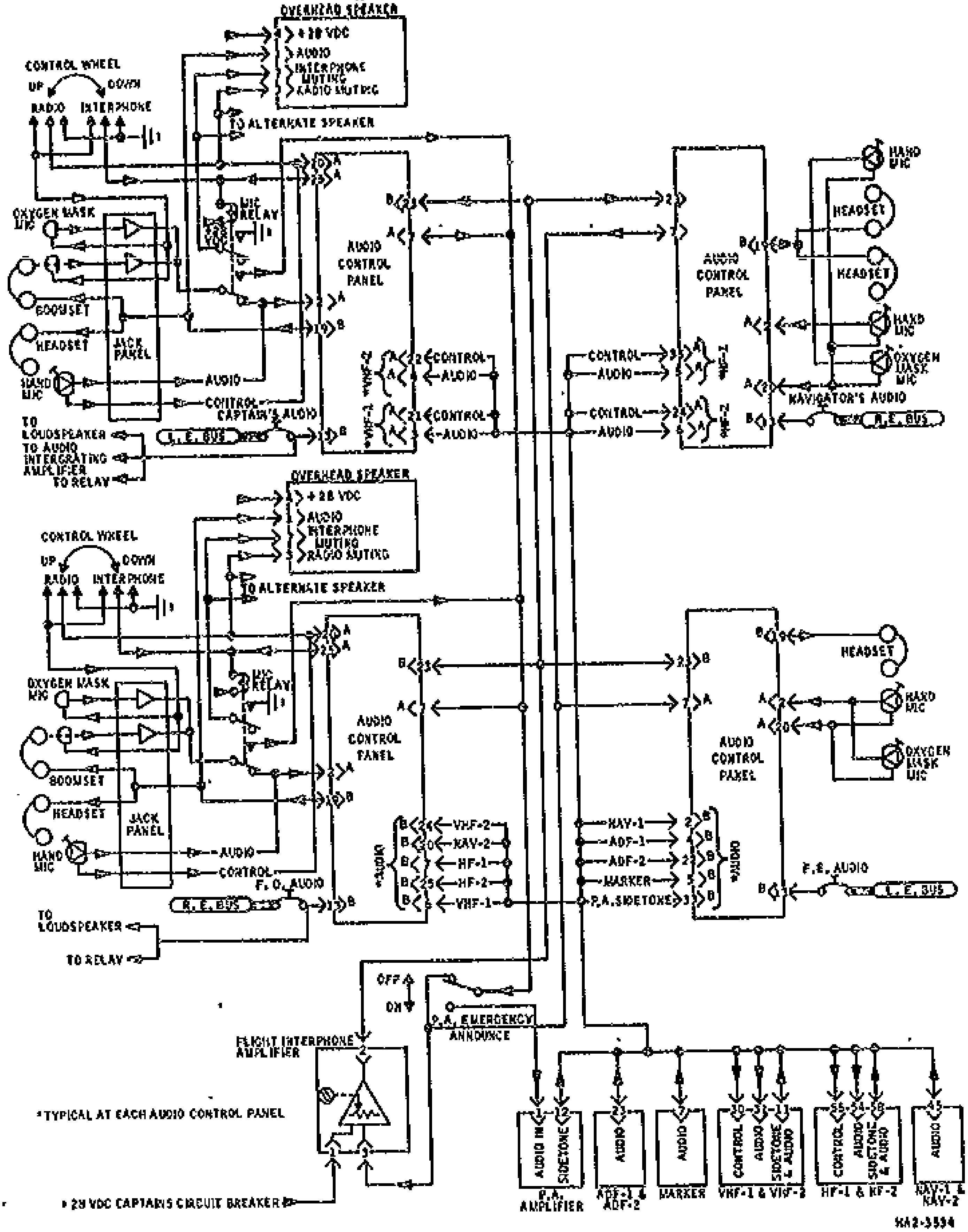
microphone contains an integral audio preamplifier and a push-to-talk switch and is provided with a jack for installation.

G. The microphone jack panels, oxygen mask microphone jack outlets, hand microphone jack outlets, conventional headset jack outlets, and the handset jack outlet are provided for the installation of the headsets, boomsets, and microphones. The microphone jack panels are installed at the captain's and first officer's stations. Each microphone jack panel contains jack outlets for the hand microphone and conventional headset, receptacles for the oxygen mask microphone and the boomset, and audio amplifiers for the oxygen mask microphone and boomset microphone. An adapter is installed in the boomset receptacle to provide a jack outlet for the boomset. The oxygen mask microphone jack outlets are installed at the flight engineer's and navigator's stations. The hand microphone jack outlets are installed at the flight crew and observer's station. The conventional headset jack outlets are installed at the navigator's and observer's stations. The observer's jack outlets are connected in parallel to the navigator's jack outlets. The handset jack outlet is installed in the nosewheel well to provide ground to flight compartment communications. The handset jack outlet is connected to the audio integrating amplifier input and output.

H. The microphone relays provide the captain's and the first officer's boom and oxygen mask microphone audio output control and loudspeaker muting during interphone communications. The captain's microphone relay is installed in the left console and the first officer's microphone relay is installed in the right console. The microphone relay is energized by the control wheel switch in the interphone position or by the hand microphone push-to-talk switch when the interphone microphone selector switch is pressed. (See Figure 2.)

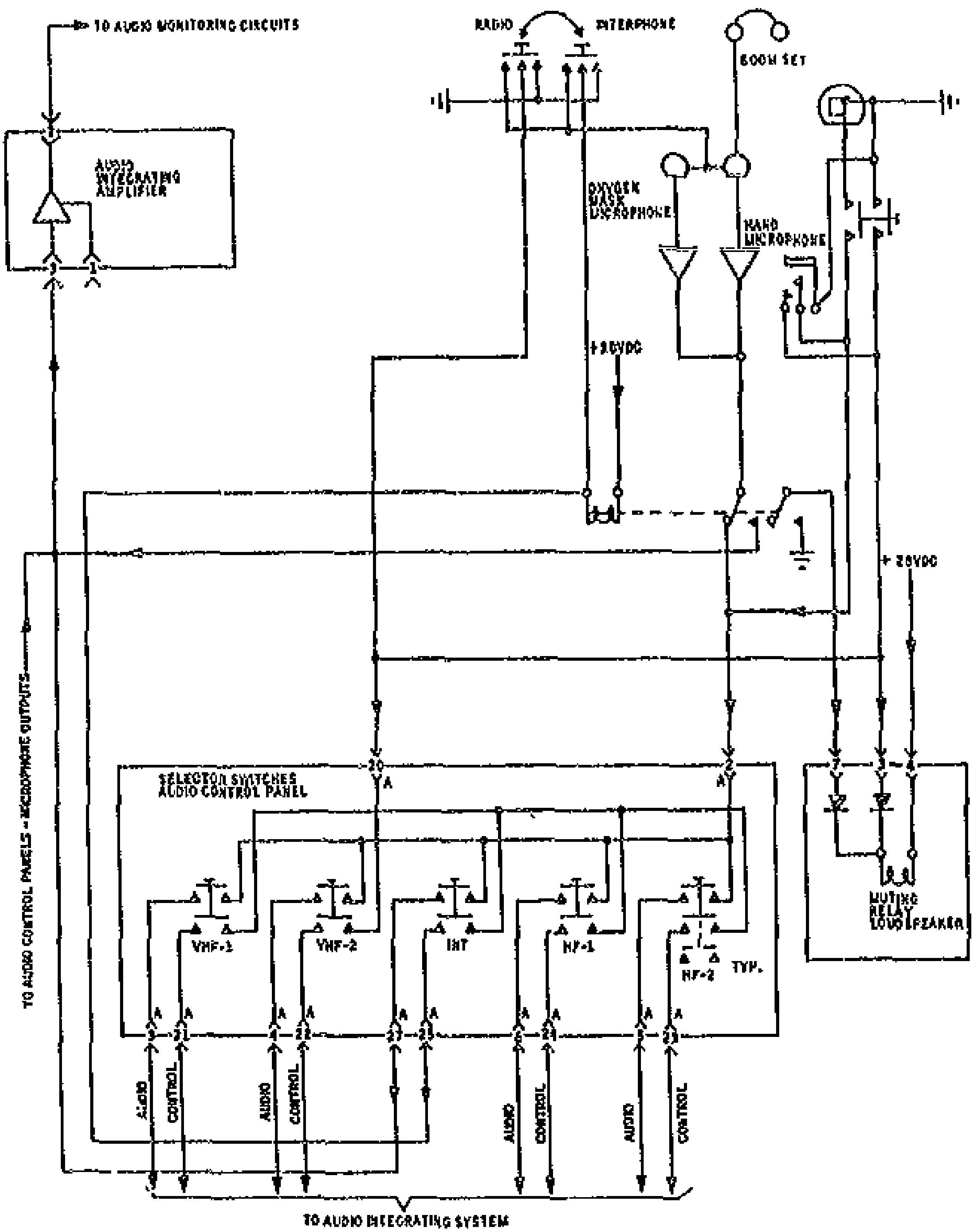
I. The microphone control switches and the passenger address emergency announce switch are provided for the audio integrating system. A microphone control switch, which provides the captain's and the first officer's boom and oxygen mask microphone control, is installed in the outboard horn of each control wheel. The control wheel switch is placed to the up position for radio communications and in the down position for interphone communications. The passenger address emergency announce switch provides a means of transferring the captain's and first officer's microphone audio outputs from the audio integrating system to the passenger address system. The passenger address emergency announce switch is installed on the aft control pedestal.

J. The audio integrating amplifier provides the necessary audio amplification for flight crew interphone communications. The amplifier contains an input transformer, input gain control, transistorized audio amplifier, and an output transformer. The amplifier input is connected to the audio control panels, microphone relays, nosewheel well jack outlet, and the passenger address emergency announce switch. The amplifier output is connected to the audio control panels and to the nosewheel well jack outlet. A screwdriver access hole is provided through the amplifier to adjust the input gain control. The amplifier is installed in the inboard radio rack on



Audio Integrating -- Simplified Schematic
Figure 1

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HAL-1778

Captain's and First Officer's --
Control and Audio Inputs
Figure 2

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shelf 1 and electrical power is supplied through the captain's audio circuit breaker located on the left dc emergency bus.

K. The loudspeakers provide the captain and the first officer a means of monitoring the uadio integrating system without the use of the headset or boomset. A loudspeaker is installed overhead at the captain's station and one is installed overhead at the first officer's station. Each loudspeaker contains a transistorized audio amplifier, muting relay, volume control, and a speaker. The audio amplifier amplifies the audio outputs from the associated station audio control panel. The muting relay mutes the speaker to prevent feedback to the microphone. The volume control is external and adjusts the speaker output volume. Electrical power is supplied by the associated station audio circuit breaker on the 28 vdc emergency bus.

2. Operation

A. For interphone operation at the captain's and first officer's stations, the interphone audio control knob is placed in a forward position and the interphone microphone selector switch is pressed. All microphone selector switch internal lamps come on, indicating power is applied to the audio integrating amplifier. Employing the boomset or oxygen mask microphone and placing the control wheel switch to the radio or interphone position energizes the microphone relay. The associated station loudspeaker is muted and microphone audio is routed through the microphone relay to the audio integrating amplifier and is then amplified. Employing the hand microphone and depressing the push-to-talk switch energizes the microphone relay. The associated station loudspeaker is muted and microphone audio is applied to the audio control panel, and routed through the microphone selector switch to the audio integrating amplifier. The amplified audio is applied to the audio control panel and routed through the isolation resistor, audio control knob potentiometer, isolation amplifier, and filter switch to the headset, boomset, and loudspeaker. The interphone microphone selector switch need not be depressed for boomset and oxygen mask microphone interphone communications if the control wheel switch is placed in the interphone position. (See Figure 2.)

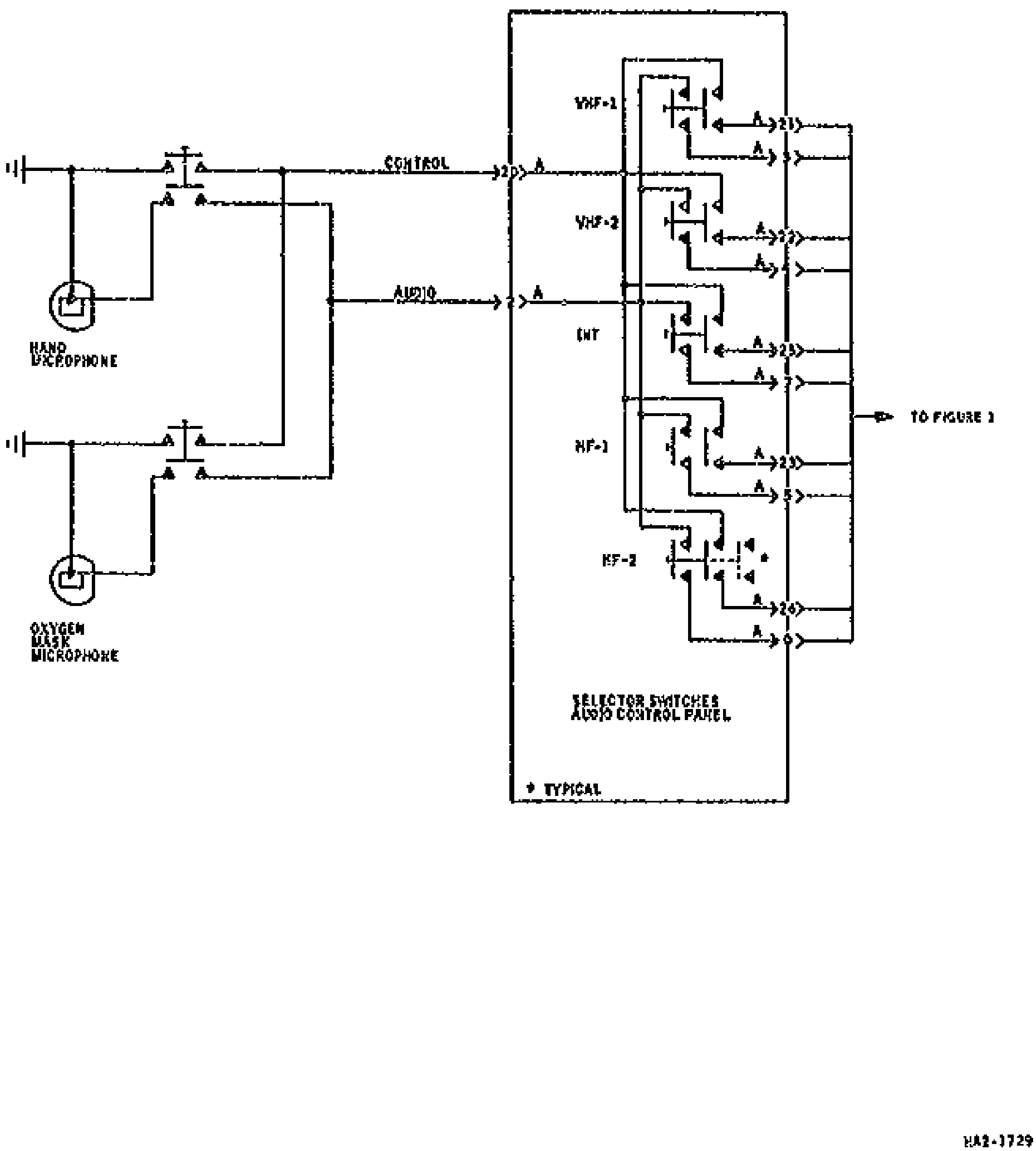
B. For interphone operation at the navigator's and flight engineer's station, the interphone audio control knob is placed in a forward position and the interphone microphone selector switch is depressed. All microphone selector switch internal lamps come on, indicating power is applied to the audio integrating amplifier. Employing the hand microphone or the oxygen mask microphone and depressing the integral push-to-talk switch applies microphone audio to the audio control panel. The microphone audio is routed through the microphone selector switch to the audio integrating amplifier and is then amplified. The amplified audio is applied to the audio control panel and routed through the isolation resistor, and audio control knob potentiometer, isolation amplifier, and filter switch to the headsets. (See Figure 3.)

C. For passenger address announcements from the captain's and first officer's station, the passenger address emergency announce switch is placed to the on position. The microphone outputs normally routed to the audio integrating amplifier from the captain's station and the first officer's station are transferred to the passenger address system by the passenger address emergency announce switch.

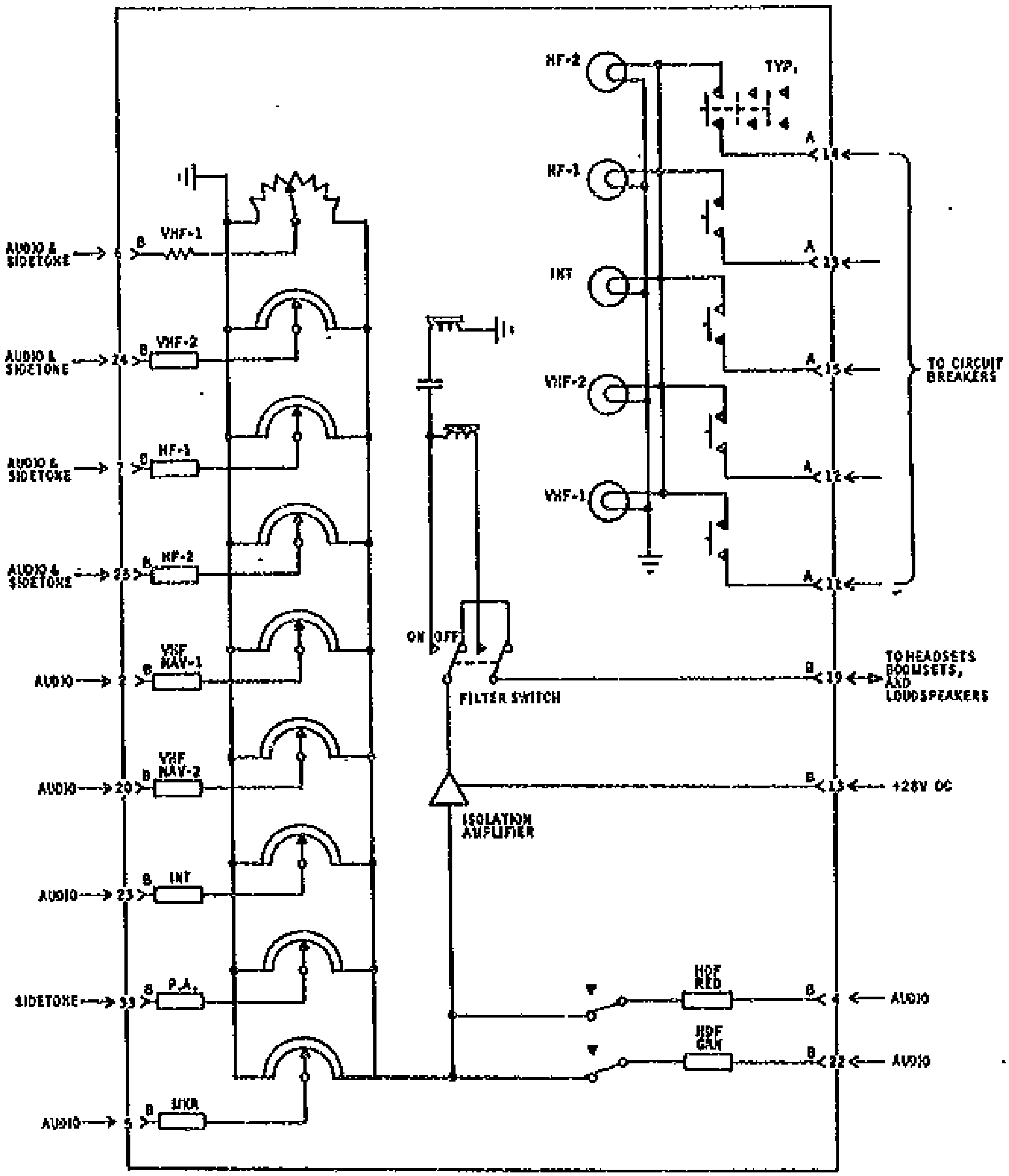
D. To monitor the audio inputs to the audio control panels, the audio control knobs are placed in a forward position and the audio monitor switches in on. The audio outputs of the cummunication transceivers, navigation receivers, audio integrating amplifier, and passenger address amplifier are applied to the audio control panel. Each audio input to the audio control panel is routed through an isolation resistor, an audio control knob potentiometer or switch, the isolation amplifier, and the filter switch to the respect station headset, boomset, and loudspeaker. (See Figure 4.)

E. For operating a communication transceiver at the captain's station and the first officer's station, the transceiver microphone selector switch is pressed and the transceiver audio control knob is placed in a forward position. Employing the boomset or oxygen mask microphone and placing the control wheel switches in the radio position mutes the loudspeakers and applies the microphone outputs to the audio control panel. Employing the hand microphone and depressing the push-to-talk switch mutes the loudspeakers and applies the microphone outputs to the audio control panel. Employing the hand microphone and depressing the push-to-talk switch mutes the loudspeakers and applies the microphone outputs to the audio control panel. The microphone outputs and transceiver mode control are routed through the microphone selector switch to the transceiver. The transceiver control relays are energized and the transceiver transfers to the transmitting mode of operation. The microphone outputs modulate the transmitter frequency and the output is sampled for sidetone. Sidetone is applied to the audio control panels. Sidetone is routed through an isolation resistor, audio control knob potentiometer, the isolation amplifier, and the filter switch to the headset, boomset, and loudspeaker.

F. For operating a transceiver at the flight engineer's and navigator's stations, the transceiver microphone selector switch is pressed and the audio control knob is placed in a forward position. Employing the hand microphone or oxygen mask microphone and depressing the push-to-talk switch applies microphone outputs and transceiver mode control to the audio control panel. Microphone outputs and transceiver mode control are routed through the microphone selector switch to the transceiver. The transceiver control relays are energized and the transceiver transfers to a transmitter mode of operation. The microphone outputs modulate the transmitter frequency and the output is sampled for sidetone. Sidetone is applied to the audio control panels. Sidetone is routed through an isolation resistor, audio control knob potentiometer, the isolation amplifier, and the filter switch to the headsets.



Flight Engineer's and Navigator's --
Control and Audio Inputs
Figure 3



Audio Monitoring and Mode Indicating --
Simplified Schematic
Figure 4

3. To Operate System

A. To Operate Interphone at Captain's Station and First Officer's Station

(1) Energize electrical buses.

(2) Place controls to position indicated.

Control	Position
Passenger address emergency announce switch	Off
Interphone microphone selector switch	Depressed
Interphone audio control knob	Forward
Boomset or oxygen mask microphone	Employed
Control wheel switches	Radio or interphone
or	
Hand microphone	Employed
Push-to-talk switch	Depressed

(3) Speak into microphone with normal tone and adjust interphone audio control knob to monitor audio at comfortable level.

B. To Operate Interphone at Flight Engineer's Station and Navigator's Station

(1) Energize electrical buses.

(2) Depress interphone microphone selector switch.

(3) Place audio control knob in a forward position.

(4) Employ hand microphone or oxygen mask microphone and depress push-to-talk switch.

(5) Speak into microphone with normal tone and adjust interphone audio control knob to monitor audio at comfortable level.

C. To Operate Passenger Address from Captain's Station and First Officer's Station

(1) Energize electrical buses.

(2) Place control in position indicated.

Control	Position
Passenger address emergency announce switch	On
Interphone microphone selector switch	Depressed
Passenger address audio control knob	Forward
Boomset or oxygen mask microphone	Employed
Control wheel switches	Radio or interphone
or	
Hand microphone	Employed
Push-to-talk switch	Depressed

(3) Speak into microphone with normal tone and adjust passenger address audio control knob to monitor audio at comfortable level.

D. To Monitor Audio

(1) Adjust audio control knobs to monitor audio at comfortable level.

(2) Place audio monitor switches in on.

(3) Adjust loudspeaker volume controls to monitor audio at comfortable level.

E. To Operate Transceivers at Captain's Station and First Officer's Station

(1) Energize electrical buses.

(2) Place controls in position indicated.

Control	Position
Transceiver microphone selector switch	Depressed
Transceiver audio control knob	Forward
Boomset or oxygen mask microphone	Employed
Control wheel switch	Radio
or	
Hand microphone	Employed
Push-to-talk switch	Depressed

(3) Speak into microphone with normal tone and adjust transceiver audio control knob to monitor audio at comfortable level.

F. To Operate Transceiver at Flight Engineer's Station and Navigator's Station

(1) Energize electrical buses.

(2) Depress transceiver microphone selector switch.

(3) Place transceiver audio control knob in forward.

(4) Employ hand microphone or oxygen mask microphone and depress push-to-talk switch.

(5) Speak into microphone with normal tone and adjust transceiver audio control knob to monitor sidetone at comfortable level.

AUDIO INTEGRATING - DESCRIPTION AND OPERATION

1. General

A. The audio integrating system provides a means of selecting and monitoring the audio outputs of the communication transceivers, navigation receivers, audio integrating amplifier, and the passenger address amplifier. In addition, the audio integrating system provides a means of directing microphone outputs to the communication transceivers, passenger address amplifier, and to the audio integrating interphone amplifier. The audio integrating system consists of audio control panels, headsets, microphones, jack outlets, control switches, audio amplifier, and flight compartment loudspeakers.

B. The audio control panels control the audio integrating system. A control panel is installed at each flight crew station. Each control panel contains communication and navigation receiver audio selector switches, a microphone selector switch, interphone mixing switch, isolation resistors, isolation amplifier, audio volume control, and a muting relay. Normal input power to the captain's and flight engineer's audio control panels is supplied by the right emergency bus. Normal input power to the first officer's and navigator's audio control panels is supplied by the left emergency bus. Emergency power is supplied to all control panels by the battery bus when the battery radio power switch is placed in the battery position.

C. The audio control panel communication and navigation receiver audio selector switches are placed in the up position to select HF and VHF communication receiver audio and transmitter sidetone, VHF navigation system voice and range signals, automatic direction finder voice and range signals, and marker receiver marker beacon signals. The communication and navigation radio inputs are routed to a common signal circuit which routes the audio to the microphone selector switch and the interphone mixing switch.

D. The audio control panel microphone selector switch is a seven position rotary switch placarded HF-1, HF-2, VHF-1, VHF-2, VHF-3, normal interphone, and emergency interphone. The microphone selector switch is placed in the communication transceiver position to direct communication and navigation radio inputs to the isolation amplifier, and to direct flight crew microphone audio and transceiver mode control to the selected transceiver. The microphone selector switch is placed in the normal or emergency interphone position to direct microphone audio to the audio integrating amplifier and direct the amplified audio to the isolation amplifier. In addition, the emergency interphone position applies microphone control directly to the oxygen mask microphone at the captain's and first officer's stations. The interphone mixing switch is placed in the up position to integrate communication and navigation receiver audio with interphone audio regardless of the position of the microphone selector switch.

E. An isolation resistor is placed in series with each audio input to the audio control panel to prevent audio interference between flight crew stations. The resultant signal loss caused by the isolation resistor is regained by the isolation amplifier. The isolation amplifier amplifies all audio inputs selected on the audio control panel. The output of the isolation amplifier is applied to the audio volume control. The volume control is mounted concentrically to the microphone selector switch and is rotated to adjust the audio to the desired level.

The audio control panel muting relay provides loudspeaker muting control to prevent feedback between the loudspeakers and the captain's and first officer's microphones. The muting relay is actuated when the associated station microphone control switches are pressed. Actuation of the captain's or first officer's station muting relay applies the radio muting signal to both loudspeakers.

F. The headsets provided for the flight crew are the conventional headsets. A headset is installed at each flight crew station.

G. The microphones provided for the flight crew are the hand microphones and oxygen mask microphones. A hand microphone is installed at each flight crew station. Each hand microphone contains an integral push-to-talk control switch. An oxygen mask microphone is installed at each flight station. The flight engineer's and navigator's oxygen mask microphones contain an integral push-to-talk switch. The captain's and first officer's oxygen mask microphone control is provided by pressing the microphone control switches located in the outboard horn of each control wheel, or by placing the audio control panel microphone control switch in the emergency interphone position.

H. Jack outlets are provided at each flight crew station for headset and microphone installation. In addition, a hand microphone and headset jack outlet are installed at the observer's station. The observer's jack outlets are an integral part of the navigator's audio station.

I. The control switches provided for the audio integrating system control are the control wheel switches and the passenger address/normal switches. A microphone switch is installed in the outboard horn of each control wheel to provide the captain and the first officer oxygen mask microphone control. The passenger address/normal switch is placed in the passenger address position to transfer the oxygen mask microphone from the audio integrating system to the passenger address system.

J. The audio amplifier provides the necessary audio amplification for flight and service interphone communication. The amplifier contains audio input circuits, a flight volume control potentiometer, a service volume control potentiometer, and a transistorized audio amplifier. The input circuits provide 3 input connections, flight crew microphone input, cabin attendant handset input, and interphone jack outlet input. The flight crew and cabin attendant inputs are applied to the flight volume control. The interphone jack outlet input is connected to the service volume control. The volume control potentiometers provide a dual amplifier input and are adjusted to

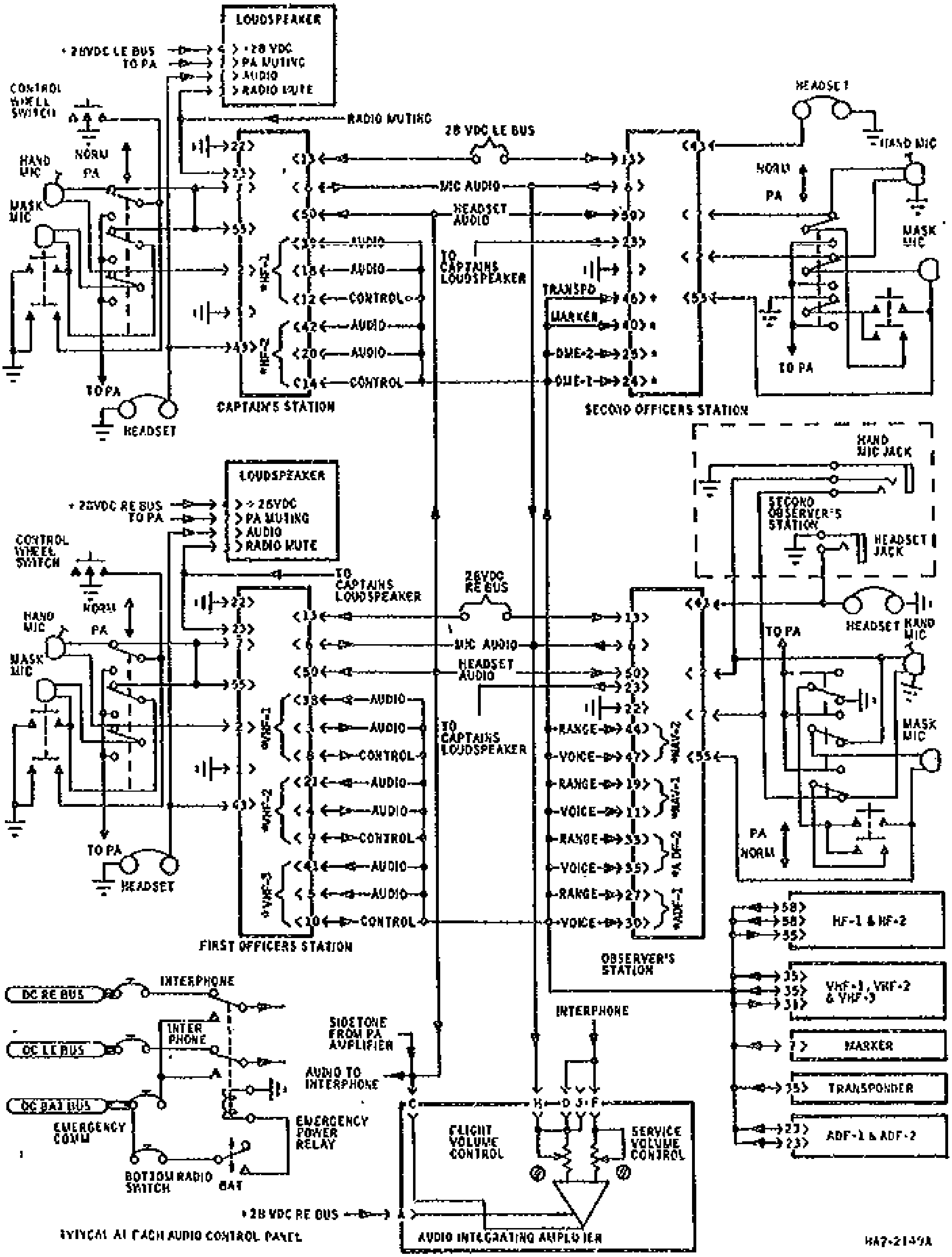
control the input level to the audio amplifier. The amplifier integrates flight and interphone audio and the amplifier output is applied to the audio control panels, handset stations, and the interphone jack outlets. Normal input power to the audio amplifier is supplied by the left emergency bus. The amplifier is housed in a 4-1/2 by 1-11/16 by 3-1/8 inch box which is attached to a mounting plate by 2 snap lock fasteners. The amplifier is installed in the inboard radio rack on shelf 6. Emergency power is supplied by the battery bus when the battery switch is placed in the battery position.

K. The loudspeakers provide the captain and the first officer a means of monitoring the audio integrating system without the use of the headset. The loudspeakers are installed in the overhead at the captain's and first officer's stations. Each loudspeaker contains a transistorized audio amplifier, muting relay, volume control, and a speaker. The audio amplifier input is connected in parallel to the headset receivers and amplifies the audio selected on the associated station audio control panel. The muting relay reduces speaker output to prevent feedback to the microphones. Both loudspeaker muting relays are actuated by the radio muting signal from either the captain's or first officer's audio control panel when a respective microphone control switch is pressed. In addition, both loudspeaker muting relays are actuated by the passenger address muting signal when announcements are made from the flight compartment. The volume control is located in the center of the speaker grill and is rotated to adjust the speaker volume to the desired level. Input power to the captain's loudspeaker is supplied by the right emergency bus. Input power to the first officer's loudspeaker is supplied by the left emergency bus. Emergency power is supplied to both loudspeakers by the battery bus when the battery switch is placed in the battery position.

2. Operation Audio Integrating

A. For interphone operation, the microphone selector switch is placed in the normal interphone position and the microphone control switch is pressed. Microphone audio is routed to the microphone selector switch and directed to the audio amplifier. The audio is routed through the flight volume control and applied to the audio amplifier and amplified. The amplified audio is routed to the audio control panels and through the isolation resistor to the microphone selector switch and, interphone mixing switch. The microphone selector switch directs the audio to the isolation amplifier. The audio is amplified and routed through the audio volume control and applied to the headset and loudspeaker.

B. For transceiver transmitter operation, the microphone selector switch is placed in a communication transceiver position, the selected transceiver audio selector switch is placed in the up position, and the microphone control switch is pressed. Microphone audio and transceiver mode control are routed to the microphone selector switch. The microphone selector switch directs the audio and mode control to the selected transceiver. The mode control signal transfers the transceiver from receiver mode to



Audio Integrating -- Simplified Schematic
Figure 1

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transmitter mode of operation. The microphone audio is applied to the transmitting circuits and sidetone is detected. Sidetone is routed to the audio control panels and through the isolation resistor, audio selector switch to the microphone selector switch and interphone mixing switch. The microphone selector switch directs the sidetone to the isolation amplifier. The sidetone is amplified and routed through the audio volume control and applied to the headset and loudspeaker.

C. For communication and navigation receiver monitoring, the audio selector switches are placed in the up position and the microphone selector switch is placed in a communication transceiver position.

Radio receiver audio is routed through the respective isolation resistor and audio selector switch to the microphone selector switch and the interphone mixing switch. The microphone selector switch directs the audio to the isolation amplifier. When the microphone selector switch is placed in an interphone position, the interphone mixing switch is placed in the up position to route radio receiver audio to the isolation amplifier. The audio is amplified and routed through the audio volume control and applied to the headset and loudspeaker.

3. <u>To Operate Audio Integrating</u>

A. To Operate Interphone

(1) Energize electrical buses.

(2) Place microphone selector switch in normal interphone or emergency interphone.

(3) Place audio volume control to midposition.

(4) Employ microphone and press associated push-to-talk switch.

(5) Speak into microphone with normal tone and adjust audio volume control to monitor audio at satisfactory level.

B. To Operate Communication Transceiver

(1) Energize electrical buses.

(2) Place microphone selector switch to desired transceiver position.

(3) Place selected transceiver audio selector switch in up position.

(4) Place audio volume control to midposition.

(5) Employ microphone and press associated push-to-talk switch.

(6) Speak into microphone with normal tone and adjust audio volume control to monitor sidetone at satisfactory level.

C. To Monitor Communication and Navigation Receivers

(1) Energize electrical buses.

(2) Place the audio selector switches to the up position.

(3) Adjust audio volume control to monitor audio at satisfactory level.

AUDIO INTEGRATING - DESCRIPTION AND OPERATION

1. General

A. The audio integrating system provides a means of selecting and monitoring the audio outputs of the communication transceivers, navigation receivers, and the audio integrating amplifier. In addition, the audio integrating system provides a means of directing microphone outputs to the communication transceivers and the audio integrating amplifier (See Figure 1). The audio integrating system consists of audio control panels, headsets and microphones, jack outlets, control switches, audio amplifier, and flight compartment loudspeakers.

B. The audio control panels control the audio integrating system. A control panel is provided at each flight crew station. Each control panel contains audio selector switches, emergency/normal switch, speaker switch, microphone selector switch, isolation resistors, isolation amplifier, volume control, microphone control relay, and automatic direction finding selector switch.

C. The audio selector switches are placed in the up position to select HF and VHF communication receiver audio and sidetone, VHF navigation receiver audio, automatic direction finder receiver audio, marker beacon receiver audio, distance measuring equipment receiver audio, and flight compartment interphone audio. The selected audio inputs are connected to the normal audio circuits which routes the selected audio through the isolation resistor, audio selector switch, and volume control potentiometer to the isolation amplifier input. In addition, the audio selector switches are an integral part of the emergency audio circuit. In conjunction with the emergency audio circuits, the audio selector switches are series connected from left to right when the switches are in the down position. When an audio switch is placed in the up position, all otheraudio selector switches are isolated from the emergency audio circuit and the selected audio is routed through the audio switch to the emergency/normal switch.

D. The emergency/normal switch provides a means of monitoring the normal audio circuits or the emergency audio circuits. When the switch is placed in the normal position, the isolation amplifier output is routed through the emergency/normal switch and the speaker switch to the headset. When the emergency/normal switch is placed in the emergency position, the isolation amplifier output is disconnected, and emergency circuit audio is routed through the emergency/normal switch and the speaker switch to the headset. The speaker switch is placed in the up position to route the audio to the respective station loudspeaker.

E. The microphone selector switch is a five position rotary switch placarded VHF-1, VHF-2, INT, HF-1, and HF-2. The microphone selector switch is placed in a communication transceiver position to route flight crew microphone audio and transceiver mode control to the selected transceiver. The microphone selector switch is placed in the interphone position to direct flight crew microphone audio to the audio integrating amplifier.

F. An isolation resistor is placed in series with each audio input to the audio control panel to prevent interference between flight crew stations. The resultant signal loss caused by the isolation resistor is regained by the isolation amplifier. The isolation amplifier amplifies all normal audio inputs to the audio control panel. The volume control is mounted concentrically to the microphone selector switch and is rotated to adjust the normal audio circuit input level to the isolation amplifier. The microphone control relay is energized when an associated station microphone control switch is actuated. Actuation of the microphone relay routes transceiver mode control to the microphone selector switch and mute control to the respective station loudspeaker. The automatic direction finder switch is a three position rotary switch placarded range, both, and voice. The switch routes the selected audio to the automatic direction finder audio selector switches.

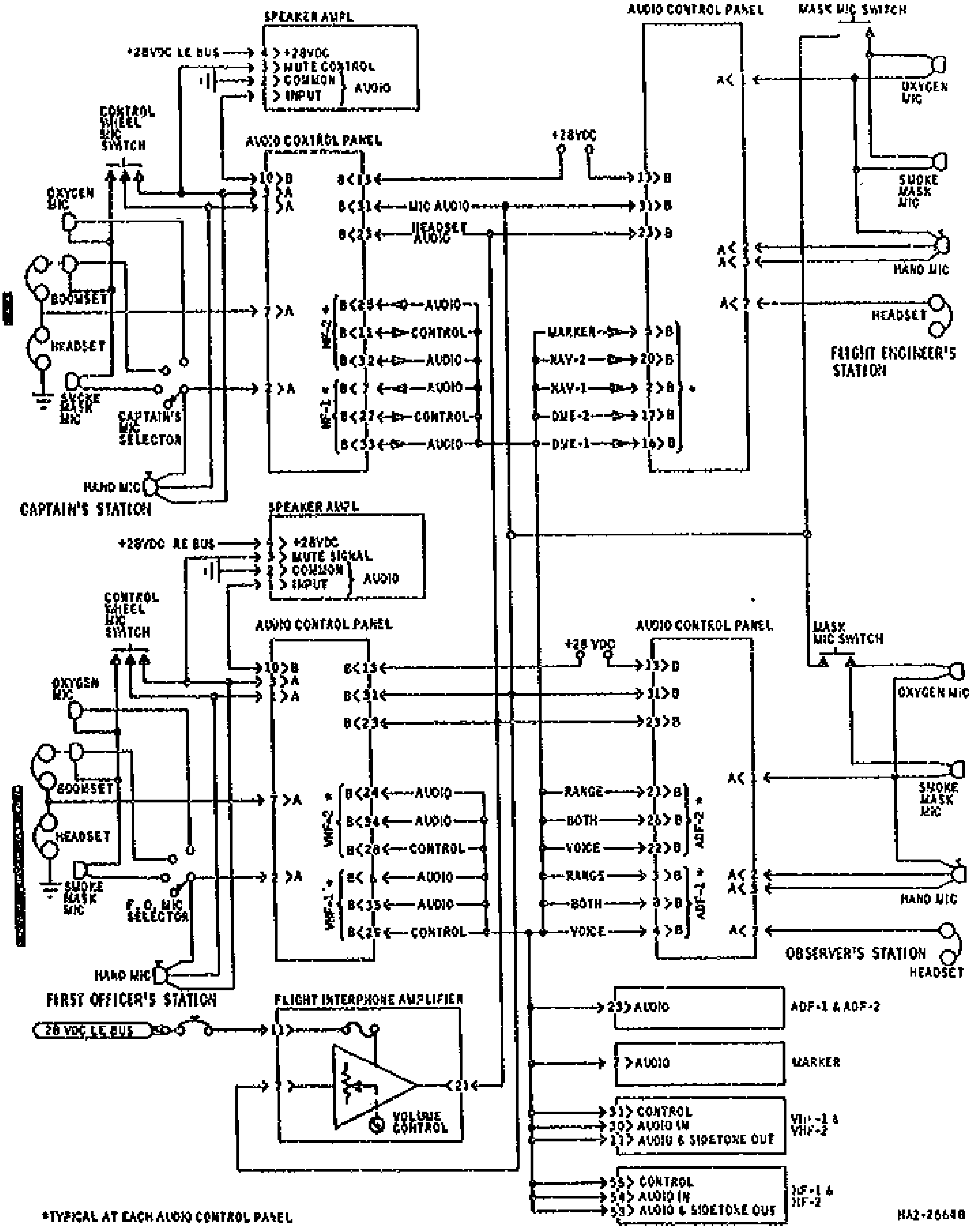
G. Headsets and hand-held microphones are located at the captain's, first officer's, flight engineer's, and observer's station. Microphone selector switches are located on the captain's and first officer's lower instrument gusset panel. These selector switches provide selection of the oxygen, boom, or smoke microphones that are controlled through switches in the outboard horns of the control wheels. Momentary microphone switches are located on the flight engineer's instrument panel and at the observer's station. The flight engineer's and observer's supplementary oxygen and smoke microphones are connected in parallel through the microphone switches, and are connected to the flight interphone only.

H. The audio amplifier provides audio amplification for flight crew intercommunication and interphone communication. The amplifier is of the modular construction and consists of a chassis with a rear connector, front panel, dust cover, and two isolation amplifier modules. Each module contains a two stage audio amplifier and a preset volume control. In conjunction with the audio integrating system, one of the modules provides the necessary audio amplification for flight crew intercommunication. Mounted on the front is a fuse holder, handle, and a mounting bracket. The audio amplifier is housed in a 1/4 ATR case and is located in the outboard radio rack on shelf 5.

I. The flight compartment loudspeakers provide the captain and first officer a means of monitoring the audio integrating system without the use of the headset. Loudspeakers are installed in the overhead at the captain's and first officer's station. Each loudspeaker contains a transistorized audio amplifier, muting relay, volume control, off/on switch, and a speaker. The audio amplifier amplifies the audio outputs from the associated station audio control panel. The muting relay mutes the speaker to prevent feedback to the microphone. The volume control is internal and is preset for a standard level. The off/on speaker switch is located in the center of the speaker grill and is used to turn the speaker amplifier on and off.

2. Operation

A. For interphone operation, the microphone selector switch is placed to the interphone position and a microphone control switch is pressed muting the



Audio Integrating -- Simplified Schematic
Figure 1

applicable flight compartment speaker. Interphone audio is routed through the microphone selector switch to the flight interphone amplifier. The amplified audio is routed to the interphone audio select switch through the volume control to the isolation amplifier. Output audio is connected to the normal/emergency switch to the headset or to the applicable overhead flight compartment speaker amplifier if the speaker switch is in the on position.

B. For transceiver operation, the microphone selector switch is placed to the applicable transceiver position and the applicable audio switch is placed in the up position. Employing the hand microphone and pressing the push-to-talk switch applies the microphone output to the control panel. Microphone outputs to the transceiver mode control are routed through the microphone selector switch to the transceiver. The transceiver control relays are energized and the transceiver transfers to the transmitter mode of operation.

C. To monitor the audio inputs to the audio control panel, place the volume control to the midposition and the applicable audio selector switch to the on position. The audio outputs of the communication transceivers, navigation receivers, and interphone amplifier are applied to the audio control panel. Each audio input is routed through an isolation resistor, volume control, and the isolation amplifier to the respective station headset, boomset, or speaker.

D. For emergency operation, the normal/emergency switch is placed to the emergency position. The control panel isolation amplifier is disconnected and microphone control is routed through the normal/emergency switch to the microphone selector switch. Audio monitoring is selected one at a time by placing the applicable audio switch in the on position. The selected audio is connected directly to the headset or speaker through the normal/emergency switch and speaker switch.

3. <u>To Operate System</u>

A. To Operate Interphone

(1) Energize electrical buses.

(2) Place controls to position indicated.

Control	Position
Audio control panel microphone select switch	Interphone
Volume control	Midposition
Interphone audio switch	On
Microphone push-to-talk switch	Pressed

(3) Speak into hand microphone and adjust volume control to a comfortable level.

B. To Operate Transceivers

(1) Energize electrical buses.

(2) Place controls to position indicated.

Control	Position
Audio control panel microphone select switch	Desired transceiver
Volume control	Midposition
Audio switch	Desired transceiver on
Microphone push-to-talk switch	Pressed

(3) Speak into hand microphone and adjust volume control to a comfortable level.

AUDIO INTEGRATING - DESCRIPTION AND OPERATION

1. General

A. The audio integrating system provides a means of selecting and monitoring the audio outputs of the communications transceivers, navigation receivers, and the audio integrating amplifier. In addition, the audio integrating system provides a means of directing microphone outputs to the communication transceivers and the audio integrating amplifier. (See figure 1.) The audio integrating system consists of audio panels, headsets and microphones, jack outlets, control switches, audio amplifier, and flight compartment loudspeakers.

B. The audio control panels control the audio integrating system. A control panel is provided at the captain's and first officer's station. Each panel contains communication and navigation receiver audio selector switches, oxygen or boom microphone selector switch, and a push-to-talk switch. The audio selector switches are placed in the up position to select communication receiver audio and side tone, navigation receiver audio, automatic direction finding receiver audio, marker beacon receiver audio, distance measuring equipment receiver audio, flight compartment interphone audio, and passenger address sidetone. The selected audio inputs are connected to the audio circuits which routes the selected audio through the isolating resistor to the isolation amplifier input. Amplifier output is routed through the volume control to the boomset, headset, and flight compartment speaker.

C. The microphone control selector push-button switches, located at the top of the audio control panel, are used with VHF-1, VHF-2, VHF-3, passenger address, flight and service interphone for microphone audio and applicable system control. The microphone selector switch is used to select either the oxygen or the boom microphone. The audio control panel push-talk switch or microphone switch, located on the control column, will operate the audio control panel relay. Audio and control from the selected oxygen or boom microphone is routed through the closed contacts of the relay to the isolation amplifier. When the relay is not operated audio from the hand microphone is applied through the relay to the isolation amplifier.

D. Conventional headset and oxygen mask microphone jacks are located at the captain's, first officer's, flight engineer's, and observer's station. Hand microphone and boom microphone jacks are provided for the captain and first officer. Hand microphone jack and a radio selector switch are provided at the first engineer's station. The radio select switch is used to select either the audio from the captain's or first officer's audio control panel.

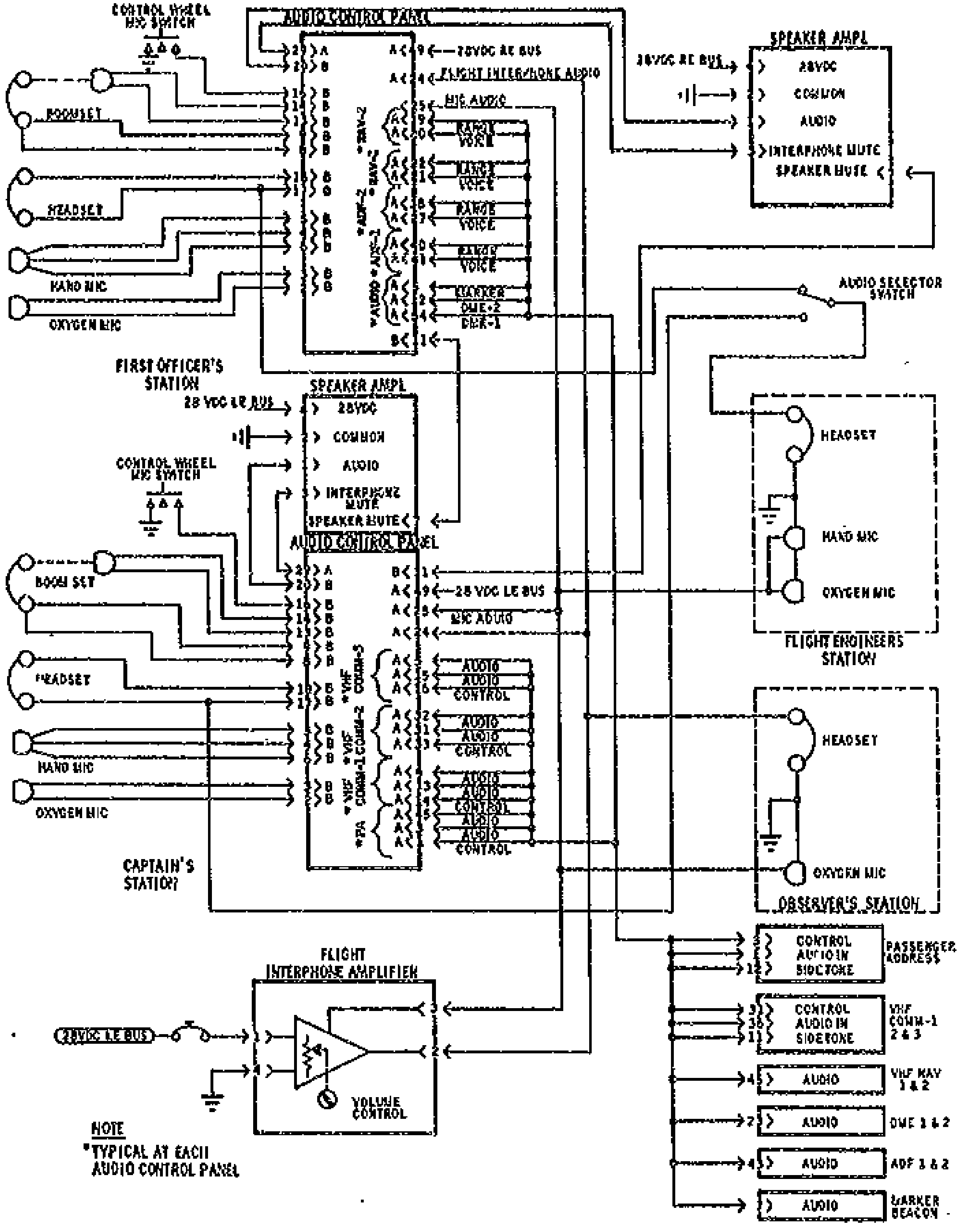
E. The audio integrating amplifier provides the necessary audio amplification for the flight crew interphone communications. The amplifier contains an input transformer, input gain control, transistorized audio amplifier, and an output transformer. The amplifier output is connected to the observer's headset and through the captain's and first officer's audio control panel to the respective headset or loudspeaker. Audio to the flight engineer's headset is selected by a switch, located on the flight engineer's panel. The switch selects audio output from the captain's or the first officer's audio control panel.

F. The loudspeakers provide the captain and first officer a means of monitoring the audio integrating system without the use of the headset or boomset. The loudspeakers are located in the overhead at the captain's and first officer's station. Input power to the captain's loudspeaker, audio control panel, and flight interphone amplifier is supplied through a line filter by the left emergency bus. The first officer's loudspeaker and audio control panel is supplied power through a line filter connected to the right emergency bus.

2. Operation

A. For interphone operation, flight interphone microphone select switch is depressed, interphone audio selector switch is placed in the up position, and a push-to-talk switch is pressed. When operating from the captain's or first officer's station using the hand microphone, audio and control is applied through audio control panel relay. The first compartment speakers are muted and the audio is routed through the flight interphone microphone select switch to the flight amplifier. The amplifier audio is routed to the audio control panel through the isolation resistor to the isolation amplifier. The output is connected through the volume control to the headset, boomset, and loudspeaker. Oxygen or boom microphone inputs may be selected at the captain's or first officer's audio control panel. Applicable push-to-talk switch, located on the control column or audio control panel is pressed for microphone control.

B. For transceiver or passenger address operation, the applicable microphone selector button is pressed and the applicable audio selector switch is placed in the up position. Employing the oxygen, boom, or hand microphone and pressing the applicable push-to-talk switch applies the microphone output to the applicable audio control panel. Microphone outputs to the transceiver control relays are energized and the transceiver transfers to the transmitter mode of operation.



Audio Integrating -- Simplified Schematic
Figure 1

C. To monitor the audio inputs to the audio control panel, place the volume control to the midposition and the applicable audio selector switch to the on position. The audio outputs of the communication transceivers, navigation receivers, and audio integrating amplifier are applied to the audio control panel. Each audio input is routed through an isolation resistor, isolation amplifier, and volume control to the respective station headset, boomset or speaker. Captain's and first officer's headset audio is routed to a switch located on the flight engineer's panel. Placing the switch in the captain's or first officer's position will switch audio output from the captain's or first officer's audio control panel to the flight engineer's headset.

3. To Operate System

A. To operate interphone

(1) Energize electrical buses.

(2) Place controls to position indicated.

Control	Position
Audio control panel microphone select switch	Flight interphone
Volume control	Midposition
Flight interphone audio switch	On
Microphone push-to-talk switch	Pressed

(3) Speak into hand microphone and adjust volume control to a comfortable level.

B. To Operate Transceiver

(1) Energize electrical buses.

(2) Place controls to position indicated.

Control	Position
Audio control panel microphone select switch	Desired transceiver
Volume control	Midposition
Audio switch	Desired transceiver on
Microphone push-to-talk switch	Pressed

(3) Speak into hand microphone and adjust volume control to a comfortable level.

AUDIO INTEGRATING - DESCRIPTION AND OPERATION

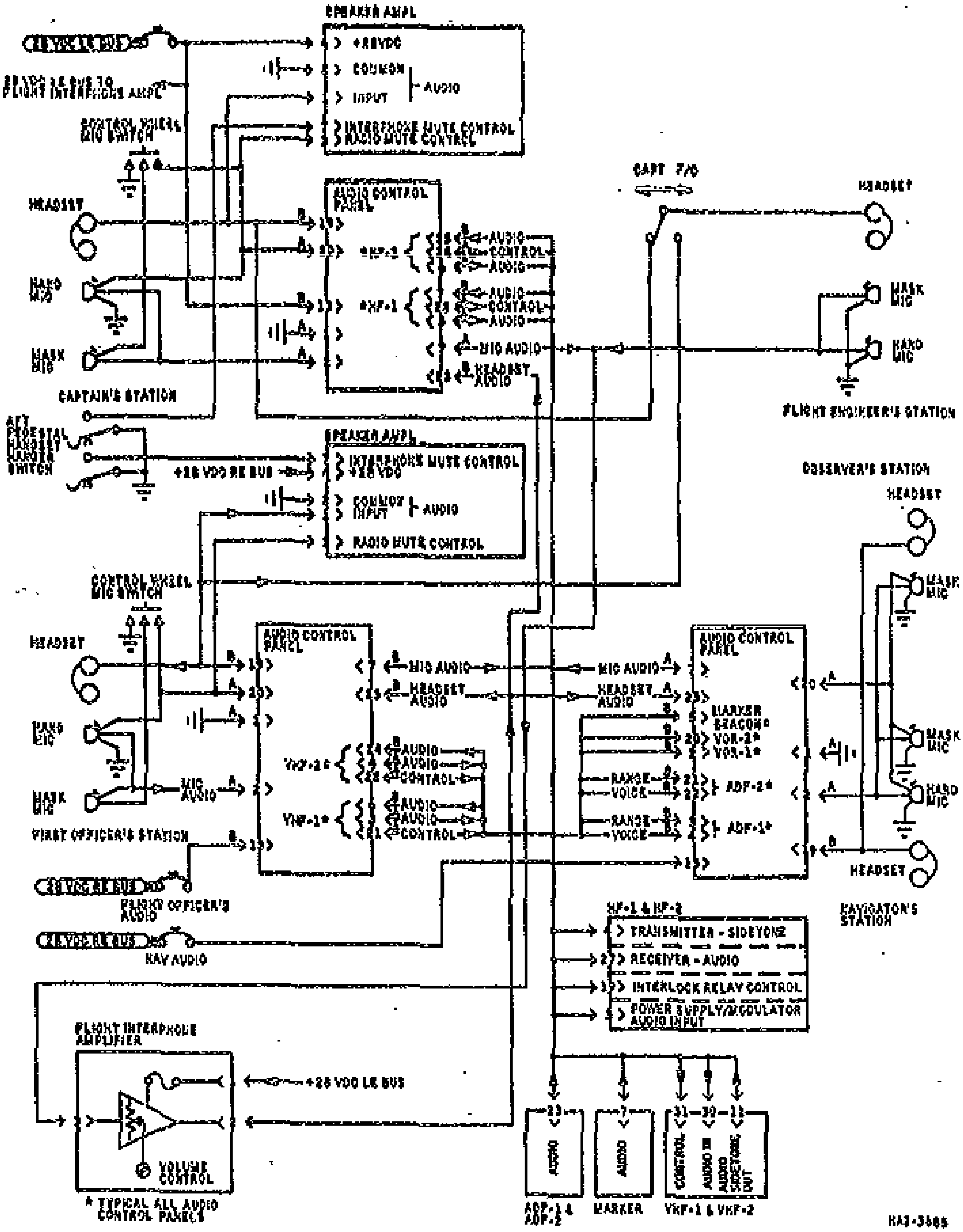
1. General

A. The audio integrating system provides a means of selecting and monitoring the audio outputs of the communication receivers, navigation receivers, and the audio integrating amplifier. In addition the audio integrating system provides a means of directing microphone outputs to the communication transmitters and the audio integrating amplifier. (See Figure 1.) The audio integrating system consists of audio control panels, headsets and microphones, jack outlets, control switches, an audio amplifier, and flight compartment loudspeakers.

B. The audio control panels control the audio integrating system. Control panels are provided at the captain's, first officer's, and the navigator's station. Each control panel contains audio selector switches, an emergency switch, microphone selector switches, isolation resistors, and isolation amplifier, a volume control, automatic direction finding switches, a marker beacon and VOR selector switches. A switch at the flight engineer's panel permits monitoring the audio selected at either the captain's or the first officer's station. This switch does not permit independent selection of system audio inputs as provided at captain's or first officer's audio control panels.

C. The audio selector switches are placed in the up position to select HF and VHF communication receiver audio and sidetone VHF navigation receiver audio, marker beacon receiver audio, automatic direction finder receiver audio, and flight compartment interphone audio. The selected audio inputs are connected to the normal audio circuits which routes the selected audio through the isolation resistor, audio selector switch, and volume control to the isolation amplifier input. In addition, the audio selector switches are an integral part of the emergency audio circuit. In conjunction with the emergency audio circuits, the audio selector switches are series connected from left to right when the switches are in the down position. When an audio switch is placed in the up position, all other audio selector switches are isolated from the emergency circuit and the selected audio is routed through the audio switch directly to the emergency switch.

D. The emergency switch provides a means of selecting normal or emergency audio circuit monitoring. When the switch is in the down position, normal audio monitoring is enabled. However, when the switch is in the emergency, up position only one selected circuit may be monitored; all other circuits will be disabled. Audio from the selected emergency circuit bypasses the isolation circuits and is supplied directly to the emergency switch for distribution to the system.



Audio Integrating -- Simplified Schematic
Figure 1

E. The microphone selector switch provides a means of selecting any one of five microphone operating configurations. The selector switch is a five section pushbutton unit that locks each pushbutton as it is pressed and releases a previously activated pushbutton. Each switch enables microphone audio and control to be supplied to the selected system. Four transmitter control functions, VHF-1, HF-1, VHF-2, and HF-2, enable routing of flight crew microphone audio and control to the selected VHF or HF system. The INT position enables routing of microphone audio and control to the audio integrating amplifier.

F. An isolation resistor is placed in series with each audio input to the audio control panel to prevent interference between flight crew stations. The resultant signal loss caused by the isolation resistor is regained by the isolation amplifier. The isolation amplifier amplifies all audio inputs to the control panel when normal operation is selected.

G. Microphone jacks for headsets and hand-held microphones are located at the captain's, first officer's flight engineer's and navigator's stations. A headset jack is located at the observer's station. All flight crew stations are equipped with jacks for mask microphones. Push-to-talk switches on the captain's and first officer's control wheel provide control of their respective microphones. A selector switch on the flight engineer's panel permits selection of either captain's or first officer's audio for monitoring.

H. The interphone audio amplifier is installed in the inboard radio rack on shelf 1 and provides the necessary audio amplification for flight personnel communications. The amplifier contains an input transformer, input gain control, transistorized audio amplifier, and an output transformer. A screwdriver access hole is provided through the amplifier chassis to adjust the input gain control. Electrical connections are made through a receptacle mounted on the amplifier chassis. The amplifier input and output are connected to the control relays by the audio signal wiring. Power is supplied by the 28-vdc left emergency bus.

I. Loudspeakers are installed at the captain's and first officer's stations. Each loudspeaker contains a transistorized audio amplifier, volume control, muting relay, and a speaker. The volume control is external and adjusts the loudspeaker output level. The muting relay is energized by the associated station push-to-talk switch and mutes the speaker to prevent feedback to the microphone. The muting relay is also energized by a speaker muting circuit which is activated when the flight compartment service interphone headset is lifted from the hanger switch. All of the components contained in the loudspeaker are mounted on the front cover panel and a perforated back cover is provided for component cooling and protection. Electrical connections are made through a receptacle mounted on the back cover.

J. A microphone control switch is installed on the right-hand horn of each control wheel. Actuation of the control wheel switch energizes the audio control panel microphone relay and mutes the associated station loudspeaker. The audio integrating amplifier provides the necessary audio amplification for flight crew communications and is installed in the inboard radio rack on shelf 1. The amplifier contains an input transformer, input gain control, transistorized audio amplifier, and an output transformer. The amplifier input and output are connected to the audio control panels and the nose wheel well jack outlet. A screwdriver access hole is provided through the amplifier chassis to adjust the input gain control. Electrical power is applied by closing the flight engineer's circuit breaker on the left emergency bus. Electrical connections are made through a receptacle mounted on the rear of the chassis.

2. Operation

A. For interphone operation, the interphone microphone selector switch is pressed, the audio selector switch is placed in the up position, and a microphone control switch is pressed muting the flight compartment speakers. Interphone audio is routed through the microphone selector switch to the flight interphone amplifier. The amplified audio is routed to the interphone selector switch through the volume control to the isolation amplifier. Output audio is connected to the headset or to the applicable overhead flight compartment speaker amplifier.

B. For radio operation, applicable microphone selector switch is pressed and the applicable audio selector switch is placed in the up position. Employing the hand microphone and pressing the push-to-talk switch applies the microphone output to the control panel. Microphone outputs to transmitter control are routed through the microphone selector switch to the transmitter. Transmitter control relays are energized and the selected transmitter operates.

C. To monitor the audio inputs to the audio control panel, place the volume control to the midposition and the applicable audio selector switch to the up position. The audio outputs of the communication receivers, navigation receivers, and interphone amplifier are applied to the audio control panel. Each audio output is routed through an isolation resistor, volume control, and the isolation amplifier to the respective station headset or speaker.

D. For emergency operation, the emergency switch is placed to the emergency position. The control panel isolation amplifier is bypassed. Audio monitoring is selected one at a time by placing the applicable audio selector in the up position. The selected audio is connected directly to the headset or speaker through the emergency switch.

3. To Operate System

A. To Operate Interphone

(1) Energize electrical buses.

(2) Place controls to position indicated.

Control	Position
Audio control panel interphone microphone select switch	Pressed
Volume control	Midposition
Interphone audio switch	Up
Microphone push-to-talk switch	Pressed

(3) Speak into hand microphone and adjust volume control to a comfortable level.

B. To Operate Transmitters

(1) Energize electrical buses.

(2) Place controls to position indicated

Control	Position
Audio control panel desired HF or VHF switch	Up
Volume control	Midposition
Audio control panel applicable microphone select switch	Pressed
Microphone push-to-talk switch	Pressed

(3) Speak into hand microphone and adjust volume control to a comfortable level.

AUDIO INTEGRATING - DESCRIPTION AND OPERATION

1. General

A. The audio integrating system provides a means of selecting and monitoring the audio outputs of the communication receivers, navigation receivers, and the interphone amplifier. In addition, the audio integrating system provides a means of directing audio outputs to the communication transmitters and the interphone amplifier. (See Figure 1.) The system consists of audio control panels, headsets and microphones, jack outlets, control switches, an audio amplifier, speaker amplifiers with 2 flight compartment loudspeakers.

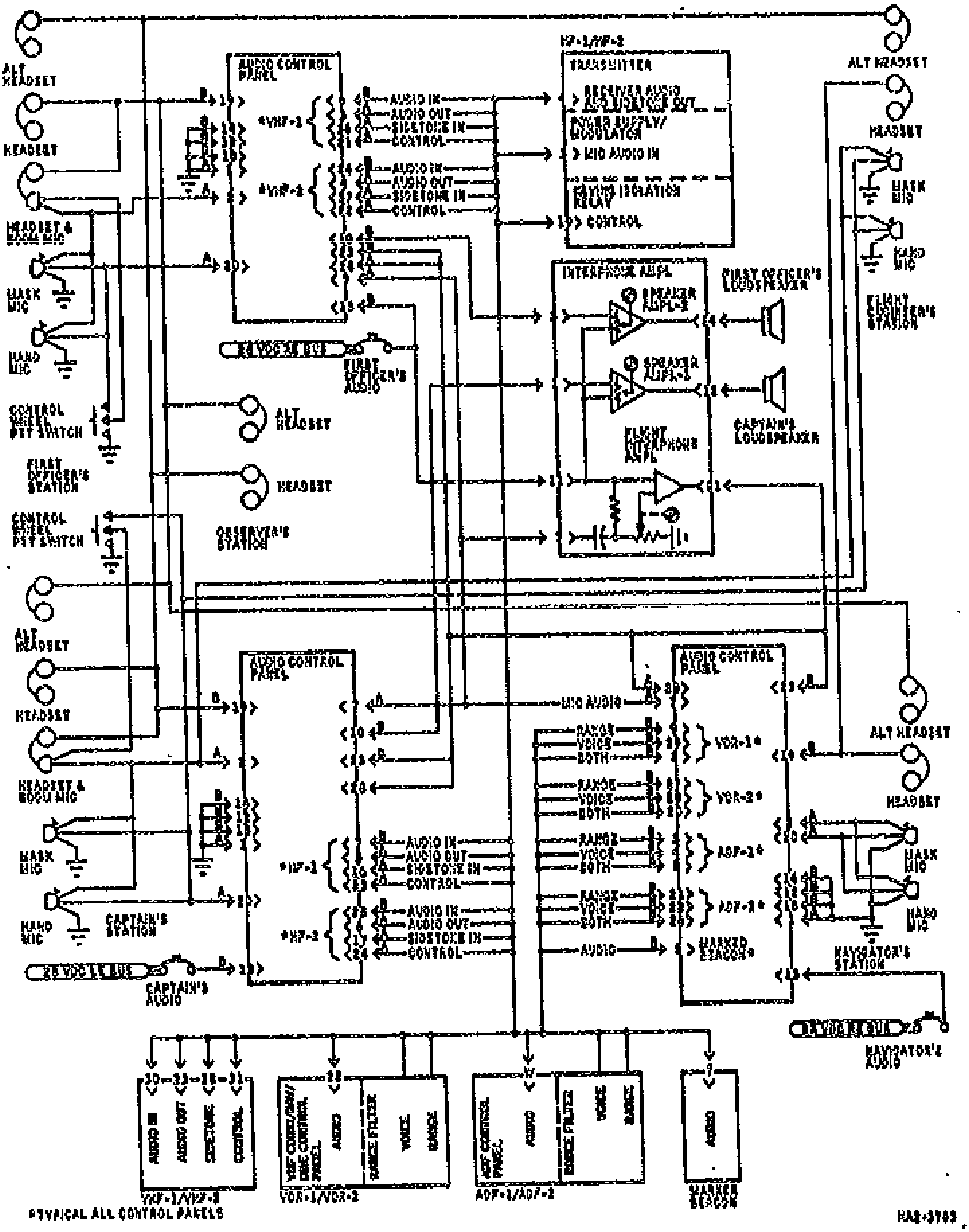
B. The audio control panels are used to select and regulate audio integrating system functions. Audio control panels are installed at captain's, first officer's and navigator's stations. Each control panel contains audio level controls, aural navigation selector switches, transmitter selector switches, an isolation amplifier, a control relay, and a speaker level control with on/off switch.

C. The audio level controls provide selection as well as level adjustment for all inputs from the communication or navigation receivers. An isolation resistor is installed in series with each audio level control to prevent crosstalk between channels. Each audio level control is in the off position when rotated fully counterclockwise. A loudspeaker level control is installed on the first officer's and captain's control panel to adjust the level of associated flight compartment speakers or turn off as required. The ADF and VOR selector switches are three position and select range, voice, or both from each of the navigation system inputs. The ADF and VOR selector switches route the selected signal to it's associated audio level control.

D. The transmitter selector switch, a 5 position pushbutton unit, selects microphone and audio outputs for the communication transmitters and interphone amplifier. In addition, the transmitter selector switch connects transmitter and interphone sidetone to the audio integrating system.

E. An isolation amplifier installed in each control panel amplifies all audio input signals sufficiently to compensate for signal loss in the isolation networks.

F. The control relay, installed in each control panel, is energized by the control signal generated by pressing microphone push-to-talk switches. When energized, the control relay bypasses the speaker level control and inserts a preset resistance in series with speakers circuit to mute the associated flight compartment speaker. The control relay also shifts communication monitoring from receiver audio to selected transmitter sidetone.



Audio Integrating -- Simplified Schematic
Figure 1

G. Headsets and hand held microphones are located at the captain's, first officer's, flight engineer's and navigator's station. A headset is located at the observer's station. Mask microphone jacks are located at all flight crew stations except the observer's. Alternate headsets jacks, wired in parallel with another station, are installed at all flight crew stations to enable audio monitoring even though one power bus may have failed. Headset and boom microphone assemblies are installed at the first officer's and captains station. Microphone control for these units is accomplished through control switches located on the outboard horn of each control wheel.

H. The interphone amplifier is installed in the radio rack and provides the necessary audio amplification for the audio integrating and interphone systems. The amplifier is of modular construction and consists of a chassis with a rear mounte connector, front panel, dust cover, 2 interphone amplifier modules, and 2 speaker amplifiers. One interphone amplifier module and the 2 speaker modules operate with the audio integrating system while the remaining interphone module operates in conjunction with the interphone system. The amplifier module used with the audio integrating system is a 2 stage audio amplifier with preset volume control mounted externally to the module in the amplifier chassis. The 2 speaker amplifiers are pushpull transformer coupled units with preset gain controls mounted within the amplifier module. Interphone input and output signals are connected to the system through the control panels. Speaker amplifier input signals are supplied through the captain's and first officer's control panel and the output routed to the associated flight compartment loudspeaker.

I. The flight compartment loudspeakers provide the captain and the first officer a means of monitoring the audio integrating system without using headsets. The loudspeakers are installed in the overhead at the captain's and first officer's station.

2. Operation

A. For interphone operation, the interphone microphone selector switch is pressed and the interphone audio level control is rotated clockwise. A microphone push-to-talk switch is pressed, muting the applicable flight compartment speaker. Microphones associated with the navigator's station do not mute flight compartment speakers. Microphone audio is routed through the interphone selector switch to the flight interphone amplifier. The amplified audio is routed through the isolation and interphone audio level control to the isolation amplifier. Output audio is routed to the flight compartment headsets and applicable flight compartment speaker when the control panel speaker control is on. Interphone sidetone from the interphone amplifier is routed through the control relay to all headsets associated with the microphone station in use.

B. For radio operation, the applicable transmitter microphone select switch is pressed and the applicable audio level control is rotated clockwise. A microphone push-to-talk switch is pressed, muting the associated flight compartment loudspeaker. Microphones associated with the navigators audio control panel do not mute flight compartment loudspeakers. Audio is routed through the applicable transmitter microphone selector switch. Microphone audio from the control panel is supplied to the selected HF or VHF system. Simultaneous with microphone audio a control signal is generated by the microphone push-to-talk switch that is used to key the selected HF or VHF transmitter. Transmitter sidetone from the operating transmitter is routed through the control relay to all headsets associated with the microphone station in use.

C. To monitor audio inputs to the audio control panel, the audio level control for the system to be monitored is placed in the midposition. Audio from the selected radio system, interphone, communications, or navigation are applied to the system through the isolation resistors and audio level controls then to the isolation amplifier. The outputs are applied to selected system headsets. To monitor audio inputs through the flight compartment speakers, select the system inputs as before. Position speaker audio level control to desired level on captains or first officer's audio control panel.

3. To Operate System

A. To Operate Interphone

(1) Energize electrical buses.

(2) Place controls to positions indicated.

Control	Position
Audio control panel interphone select switch	Pressed
Interphone audio level control	Midposition
Microphone push-to-talk switch	Pressed

(3) Speak into microphone and adjust volume to comfortable level.

B. To Operate Radio

(1) Energize electrical buses.

(2) Place controls to positions indicated.

Control	Position
Audio control panel transmitter selector	Desired transmitter
Applicable transmitter audio level control	Midposition
Microphone push-to-talk switch	Pressed

(3) Speak into hand microphone and adjust volume control to a comfortable level.

AUDIO INTEGRATING - DESCRIPTION AND OPERATION

1. General

A. The audio integrating system provides a means of selecting and monitoring the audio outputs of the communication transceivers, navigation receivers, and the audio integrating amplifier. In addition, the audio integrating system provides a means of directing microphone outputs to the communication transceivers, passenger address, and the audio integrating amplifier. (See Figure 1.) The audio integrating system consists of audio control panels, headsets and microphones, jack outlets, control switches, audio amplifier, and flight compartment loudspeakers.

B. The audio control panels control the audio integrating system. Control panels are provided at the captain's, first officer's, flight engineer's, and observer's stations. Each control panel contains microphone selector switches, audio selector switches, isolation resistors, relays, isolation amplifier, emergency switch, and a volume control.

C. The audio selector switches are placed in the up position to select HF and VHF communication receiver audio and sidetone applicable navigation receiver audio, passenger address sidetone, and flight compartment audio. The selected audio inputs are connected to the normal audio circuits which routes the selected audio through the isolation resistor, audio selector switch, and volume control potentiometer to the isolation amplifier input. In addition, the audio selector switches are an integral part of the emergency audio circuit. In conjunction with the emergency audio circuits, the audio selector switches are series connected from left to right when the switches are in the down position. When an audio switch is placed in the up position, all other audio selector switches are isolated from the emergency audio circuit and the selected audio is routed through the audio switch to the emergency/normal switch.

D. The emergency switch provides a means of selecting normal or emergency audio circuit monitoring. When the switch is in the down position, normal audio monitoring is enabled. However, when the switch is in the emergency up position only one selected circuit may be monitored; all other circuits will be disabled. Audio from the selected emergency circuit bypasses the isolation circuits and is supplied directly to the emergency switch for distribution to the system.

E. The microphone selector switch provides a means of selecting microphone operating configurations. The selector switch is a pushbutton unit that locks each pushbutton as it is pressed and releases a previously activated pushbutton. Each switch enables microphone audio and control to be supplied to the selected system. Transmitter control functions, VHF-1, HF-1, VHF-2, and HF-2, enable routing of flight crew microphone audio and control to the selected VHF or HF system. The INT and PA positions enables routing of microphone audio and control to the audio integrating and passenger address amplifiers.

F. An isolation resistor is placed in series with each audio input to the audio control panel to prevent interference between flight crew stations. The resultant signal loss caused by the isolation resistor is regained by the isolation amplifier. The isolation amplifier amplifies all audio inputs to the control panel when normal operation.is selected.

G. Headsets, oxygen, and hand-held microphones are located at the captain's, first officer's, flight engineer's, and observer's stations. Push-to-talk control of the oxygen mask microphone for the captain and first officer is controlled by a 3-position switch located in the outboard horns of the control wheels. Push-to-talk switch assemblies, located on their respective panels, controls the oxygen mask microphones at the flight engineer's and observer's station. A flight compartment interphone switch, located on the overhead switch panel, is used to parallel and isolate the service and flight interphone systems. A flight engineer's audio selector switch, located on the flight engineer's panel, is used to monitor the voice recorder, flight recorder, and normal audio outputs. The 3-position switch has a voice, flight, and normal position.

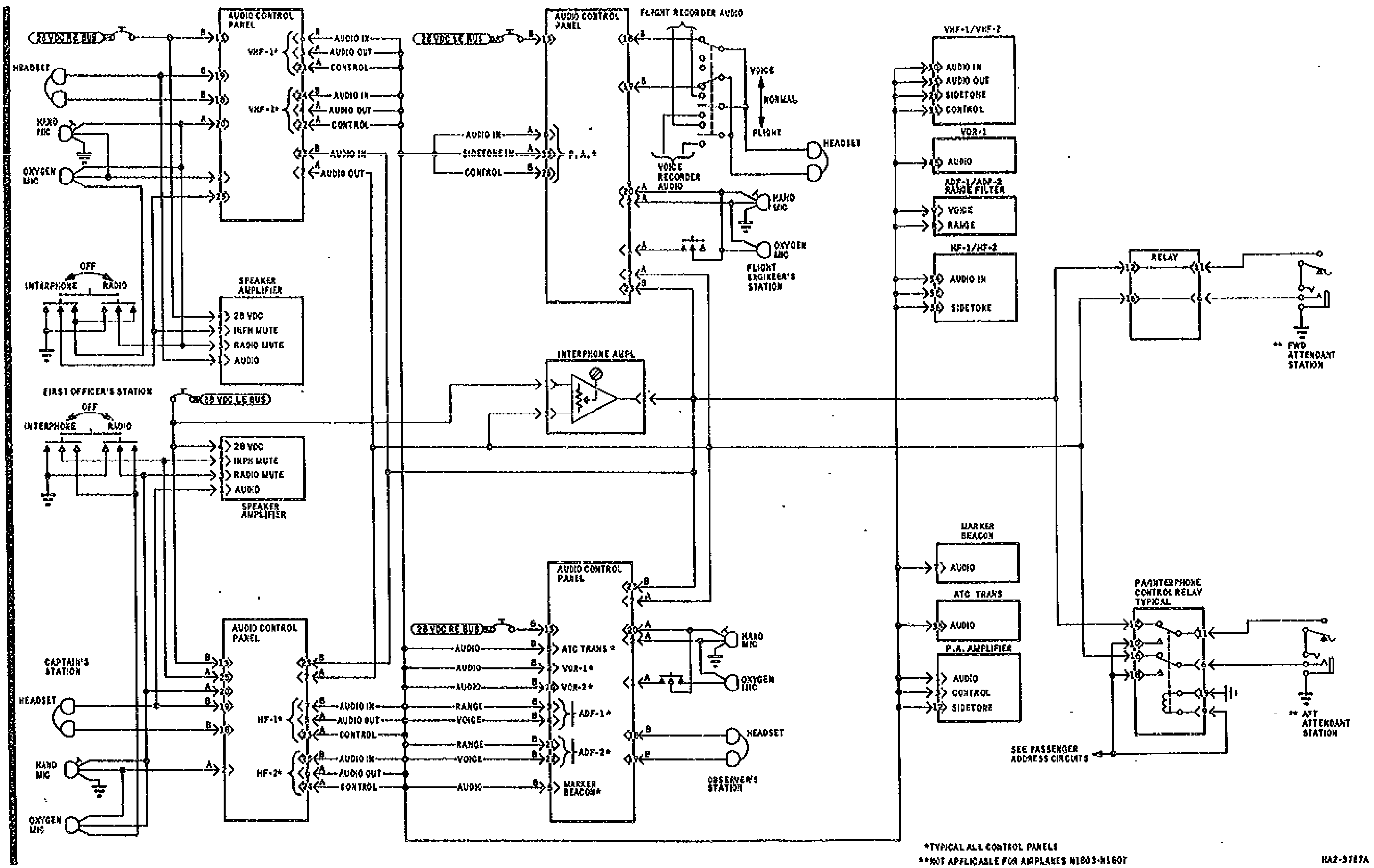
H. The audio integrating amplifier provides the necessary audio amplification for flight crew interphone communications. The amplifier contains an input transformer, input gain control, transistorized audio amplifier, and an output transformer. A screwdriver access hole is provided through the amplifier to adjust the input gain control. The amplifier is installed in the inboard radio rack on shelf 5 and electrical power is supplied through the captain's audio circuit breaker located on the left dc emergency bus.

I. The flight compartment loudspeakers provide the captain and first officer a means of monitoring the audio integrating system without the use of the headset. Loudspeakers are installed in the overhead at the captain's and first officer's station. Each loudspeaker contains a transistorized audio amplifier, muting relay, volume control, and a speaker. The audio amplifier amplifies the audio outputs from the associated station audio control panel. The muting relay mutes the speaker to prevent feedback to the microphone. The volume control is located in the center of the speaker grill and is rotated to adjust the speaker volume.

NOTE: Paragraphs I.,J.,K., and L. are not applicable for Airplanes N1803 through N1807.

J. The passenger address/interphone control relays are installed in the radio rack and a relay is provided for each handset station. The control relay connects the handset audio signal wiring to the interphone amplifier when the control relay is deenergized, and connects the handset audio signal wiring to the passenger address amplifier when the control relay is energized. Electrical connections are made through the receptacle mounted on the relay housing.

K. A handset is installed in each cabin attendant panel. Each handset consists of an audio receiver, microphone, and a push-to-talk switch. The handset receiver is connected to the audio signal wiring by the hanger



Audio Integrating -- Simplified Schematic
Figure 1

switch, and the microphone is connected to the audio signal wiring by the push-to-talk switch.

L. Cabin attendant panels are installed in the forward attendant station, and in the aft attendant station. For use with the interphone system, each panel contains a handset hanger and switch and selective call switches. Removal of the handset from the hanger operates the hanger switch to connect the handset receiver to the audio signal wiring. The selective call switches alert flight personnel and ensure the handset is on the interphone system for station-to-station communications.

2. Operation

A. For interphone operation, the interphone microphone selector switch is pressed, the audio selector switch is placed in the up position, and a microphone control switch is pressed muting the flight compartment speakers. Interphone audio is routed through the microphone selector switch to the flight interphone amplifier. The amplified audio is routed to the interphone selector switch through the volume control to the isolation amplifier. Output audio is connected to the headset or to the applicable overhead flight compartment speaker amplifier.

NOTE: Paragraph 2. B. is not applicable for Airplanes N1803 through N1807.

B. For cabin attendant interphone operation, the handset is removed from the hanger and the attendant or pilot call switch is pressed. The call switch alerts flight personnel and ensures that the handset is connected to the flight interphone system.

C. For radio operation, applicable microphone selector switch is pressed and the applicable audio selector switch is placed in the up position. Employing the hand microphone and pressing the push-to-talk switch applies the microphone output to the control panel. Microphone outputs to transmitter control are routed through the microphone selector switch to the transmitter. Transmitter control relays are energized and the selected transmitter operates.

D. To monitor the audio inputs to the audio control panel, place the volume control to the midposition and the applicable audio selector switch to the up position. The audio outputs of the communication receivers, navigation receivers, and interphone amplifier are applied to the audio control panel. Each audio output is routed through an isolation resistor, volume control, and the isolation amplifier to the respective station headset or speaker.

E. For emergency operation, the emergency switch is placed to the emergency position. The control panel isolation amplifier is bypassed. Audio monitoring is selected one at a time by placing the applicable audio selector in the up position. The selected audio is connected directly to the headset or speaker through the emergency switch.

3. To Operate System

A. To Operate Interphone

(1) Energize electrical buses.

(2) Place interphone switch, located on overhead switch panel, to cockpit position.

(3) Place audio switch, located on flight engineer's panel, to normal position.

(4) Place controls to position indicated.

Control	Position
Audio control panel microphone select switch	Interphone
Volume control	Midposition
Interphone audio switch	On
Microphone push-to-talk switch	Pressed

(5) Speak into hand microphone and adjust volume control to a comfortable level.

B. To Operate Transceivers

(1) Energize electrical buses.

(2) Place audio switch, located on flight engineer's panel, to normal position.

(3) Place controls to position indicated.

Control	Position
Audio control panel microphone select switch	Desired transceiver
Volume control	Midposition
Audio switch	Desired transceiver on
Microphone push-to-talk switch	Pressed

(h) Speak into hand microphone and adjust volume control to comfortable level.

AUDIO INTEGRATING - DESCRIPTION AND OPERATION

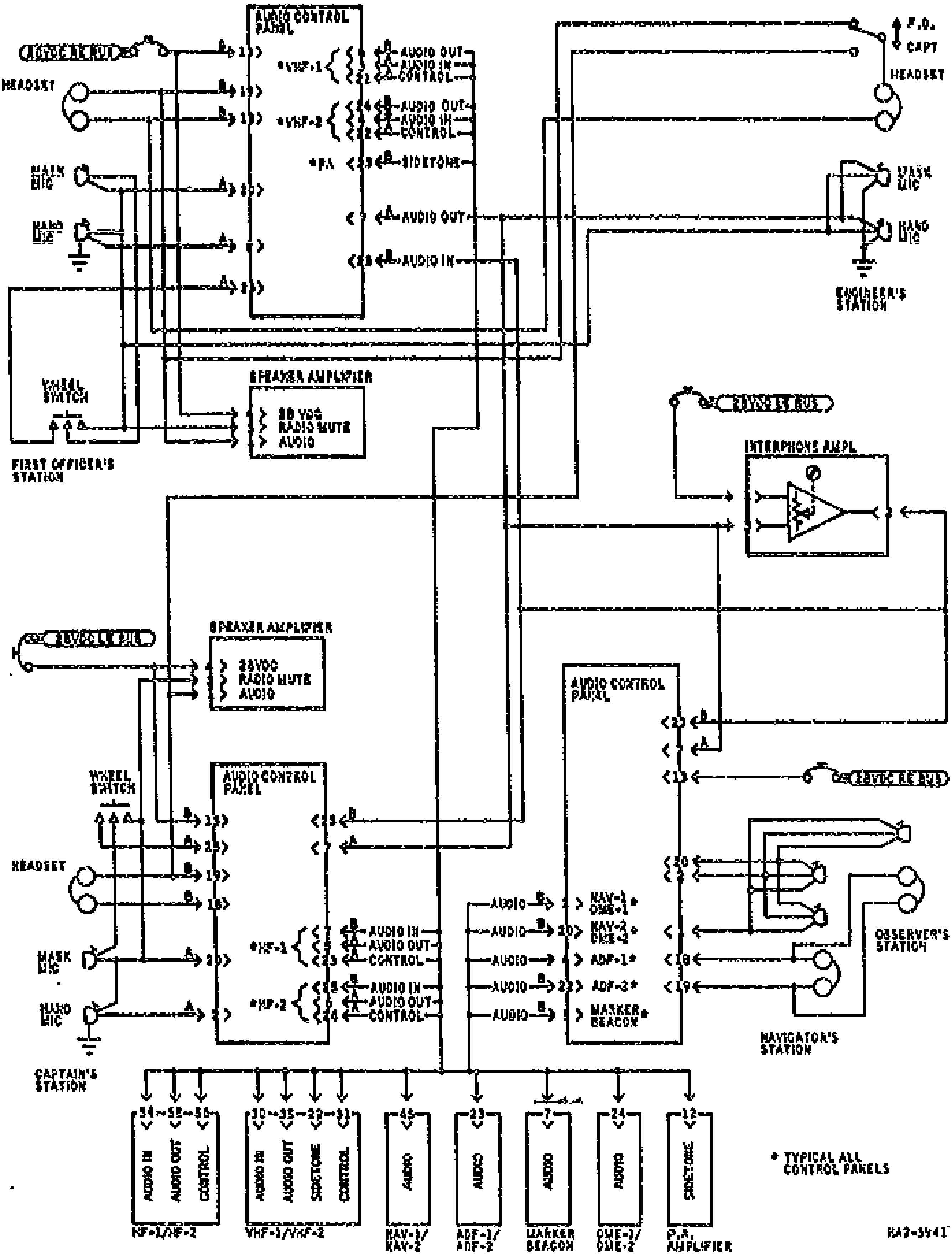
1. General

A. The audio integrating system provides a means of selecting and monitoring the audio outputs of the communication receivers, navigation receivers, and the audio integrating amplifier. In addition, the audio integrating system provides a means of directing microphone outputs to the communication transmitters and the audio integrating amplifier. (See Figure 1.) The audio integrating system consists of audio control panels, headsets, and microphones, jack outlets, control switches, an audio amplifier, and flight compartment loudspeakers.

B. The audio control panels control the audio integrating system. Control panels are provided at the captain's, first officer's, and the navigator's station. Each control panel contains audio selector switches, an emergency switch, microphone selector switches, isolation resistors, an isolation amplifier, a volume control, automatic direction finding switches, a marker beacon, a filter and VOR selector switches. A switch at the flight engineer's station permits monitoring the audio selected at either the captain's or the first officer's station. This switch does not permit independent selection of system audio inputs as provided at captain's or first officer's audio control panels.

C. The audio selector switches are placed in the up position to select HF and VHF communication receiver audio and sidetone, VHF navigation receiver audio, marker beacon receiver audio, automatic direction finder receiver audio, and flight compartment interphone audio. The selected audio inputs are connected to the normal audio circuits which routes the selected audio through the isolation resistor, audio selector switch, and volume control to the isolation amplifier input. In addition, the audio selector switches are an integral part of the emergency audio circuit. In conjunction with the emergency audio circuits, the audio selector switches are series connected from left to right when the switches are in the down position. When an audio switch is placed in the up position, all other audio selector switches are isolated from the emergency circuit and the selected audio is routed through the audio switch directly to the emergency switch.

D. The emergency switch provides a means of selecting normal or emergency audio circuit monitoring. When the switch is in the down position, normal audio monitoring is enabled. However, when the switch is in the emergency up position only one selected circuit may be monitored; all other circuits will be disabled. Audio from the selected emergency circuit bypasses the isolation circuits and is supplied directly to the emergency switch for distribution to the system.



Audio Integrating -- Simplified Schematic
Figure 1

E. The microphone selector switch provides a means of selecting any one of five microphone operating configurations. The selector switch is a five section pushbutton unit that locks each pushbutton as it is pressed and releases a previously activated pushbutton. Each switch enables microphone audio and control to be supplied to the selected system. Four transmitter control functions, VHF-1, HF-1, VHF-2, and HF-2, enable routing of flight crew microphone audio and control to the selected VHF or HF system. The INT position enables routing of microphone audio and control to the audio integrating amplifier.

F. An isolation resistor is placed in series with each audio input to the audio control panel to prevent interference between flight crew stations. The resultant signal loss caused by the isolation resistor is regained by the isolation amplifier. The isolation amplifier amplifies all audio inputs to the control panel when normal operation is selected.

G. Microphone jacks for headsets and hand-held microphones are located at the captain's, first officer's, flight engineer's and navigator's stations. A headset jack is located at the observer's station. All flight crew stations are equipped with jacks for mask microphones. Push-to-talk switches on the captain's and first officer's control wheel provide control of their respective microphones. A selector switch on the flight engineer's panel permits selection of either captain's or first officer's audio for monitoring.

H. The audio integrating amplifier provides the necessary audio amplification for flight crew interphone communications. The amplifier contains an input transformer, input gain control, transistorized audio amplifier, and an output transformer. A screwdriver access hole is provided through the amplifier to adjust the input gain control. The amplifier is installed in the left hand console and electrical power is supplied through the captain's audio circuit breaker located on the left dc emergency bus.

I. The flight compartment loudspeakers provide the captain and first officer a means of monitoring the audio integrating system without the use of the headset. Loudspeakers are installed in the overhead at the captain's and first officer's station. Each loudspeaker contains a transistorized audio amplifier, muting relay, volume control, and a speaker. The audio amplifier amplifies the audio outputs from the associated station audio control panel. The muting relay mutes the speaker to prevent feedback to the microphone. The volume control is located in the center of the speaker grill and is routed to adjust the speaker volume.

2. Operation

A. For interphone operation, the interphone microphone selector switch is pressed, the audio selector switch is placed in the up position, and a microphone control switch is pressed muting the flight compartment speakers. Interphone audio is routed through the microphone selector switch to the flight interphone amplifier. The amplified audio is routed

to the interphone selector switch through the volume control to the isolation amplifier. Output audio is connected to the headset or to the applicable overhead flight compartment speaker amplifier.

B. For radio operation, applicable audio selector switch is placed in the up position. Employing the hand microphone and pressing the push-to-talk switch applies the microphone output to the control panel. Microphone outputs to transmitter control are routed through the microphone selector switch to the transmitter. Transmitter control relays are energized and the selected transmitter operates.

C. To monitor the audio inputs to the audio control panel, place the volume control to the midposition and the applicable audio selector switch to the up position. The audio outputs of the communication receivers, navigation receivers, and interphone amplifier are applied to the audio control panel. Each audio output is routed through an isolation resistor, volume control, and the isolation amplifier to the respective station headset or speaker.

D. For emergency operation, the emergency switch is placed to the emergency position. The control panel isolation amplifier is bypassed. Audio monitoring is selected one at a time by placing the applicable audio selector in the up position. The selected audio is connected directly to the headset or speaker through the emergency switch.

3. To Operate System

A. To Operate Interphone

(1) Energize electrical buses.

(2) Place controls to positon indicated.

Control	Position
Audio control panel microphone select switch	Interphone
Volume control	Midposition
Interphone audio switch	On
Microphone push-to-talk switch	Pressed

(3) Speak into hand microphone and adjust volume control to a comfortable level.

B. To Operate Transceivers

(1) Energize electrical buses.

(2) Place controls to position indicated.

Control	Position
Audio control panel microphone select switch	Desired transceiver
Volume control	Midposition
Audio switch	Desired transceiver on
Microphone push-to-talk switch	Pressed

(3) Speak into hand microphone and adjust volume control to a comfortable level.

AUDIO INTEGRATING - DESCRIPTION AND OPERATION

1. General

A. The audio integrating system provides a means of selecting and monitoring the audio outputs of the communication transceivers, navigation receivers, audio integrating amplifier, and the passenger address amplifier. In addition, the audio integrating system provides a means of directing microphone outputs to the communication transceivers, and to the flight interphone amplifier. The audio integrating system consists of audio control panels, headsets, microphones, jack outlets, audio jack boxes, control switches, an audio amplifier, and flight compartment loudspeakers.

B. The audio control panels control the audio integrating system; panels are installed at the captain's, first officer's and navigator's station. Each control panel contains the following controls: Communication and navigation receiver, interphone, and passenger address audio selector switches; microphone selector switches; a radio/interphone control switch; a loudspeaker muting switch, and a volume control. Internally the panel is equipped with isolation resistors, 2 isolation amplifiers, and 4 control relays. Normal input power is supplied to all panels by the dc right emergency bus. Dc power is also supplied by the dc left emergency bus through an energized power control relay that switches the power input from the right to left dc emergency bus.

C. The control panel communication and navigation receiver audio selector switches are placed in the up position to select HF and VHF communication receiver audio and transmitter sidetone. VHF navigation system voice signals, and marker receiver marker beacon signals. An isolation resistor is in series with each audio input to the audio control panel to prevent interference between flight crew stations. The resultant signal loss is compensated for by signal amplification in the isolation amplifier. Each audio input is routed through a common volume control before being applied to the isolation amplifiers. The microphone selector switches connect selected HF, VHF or interphone microphone audio and control into the audio integrating system. A boom/mask microphone selector switch provides a means of selecting either type microphone for operation. Four control relays in the control panel are utilized to select HF audio or sidetone, provide radio and interphone microphone control, and provide flight compartment speaker muting control. The speaker switch, also, controls flight compartment speaker muting by opening the circuit to the speaker amplifier. The radio/interphone selector provides microphone control in parallel with the associated wheel switch. The PA switch enables monitoring of passenger address sidetone.

D. Audio inputs and outputs to the audio integrating system from the flight compartment are enabled through the installation of headsets and microphones at each of the flight crew stations. Headsets, mask microphones, and boom microphone and headset assemblies are installed at each flight crew station. Handsets are installed at all stations except the flight

engineer's. The captain's mask microphone may be selected to supply audio to the passenger address system. At each station, the audio equipment is connected to the system through audio jack boxes.

E. The audio jack boxes provide a means of connecting the headsets and microphones into the audio integrating system. Jack outlets and receptacles are provided for jack and the boom microphone and headset assembly connection.

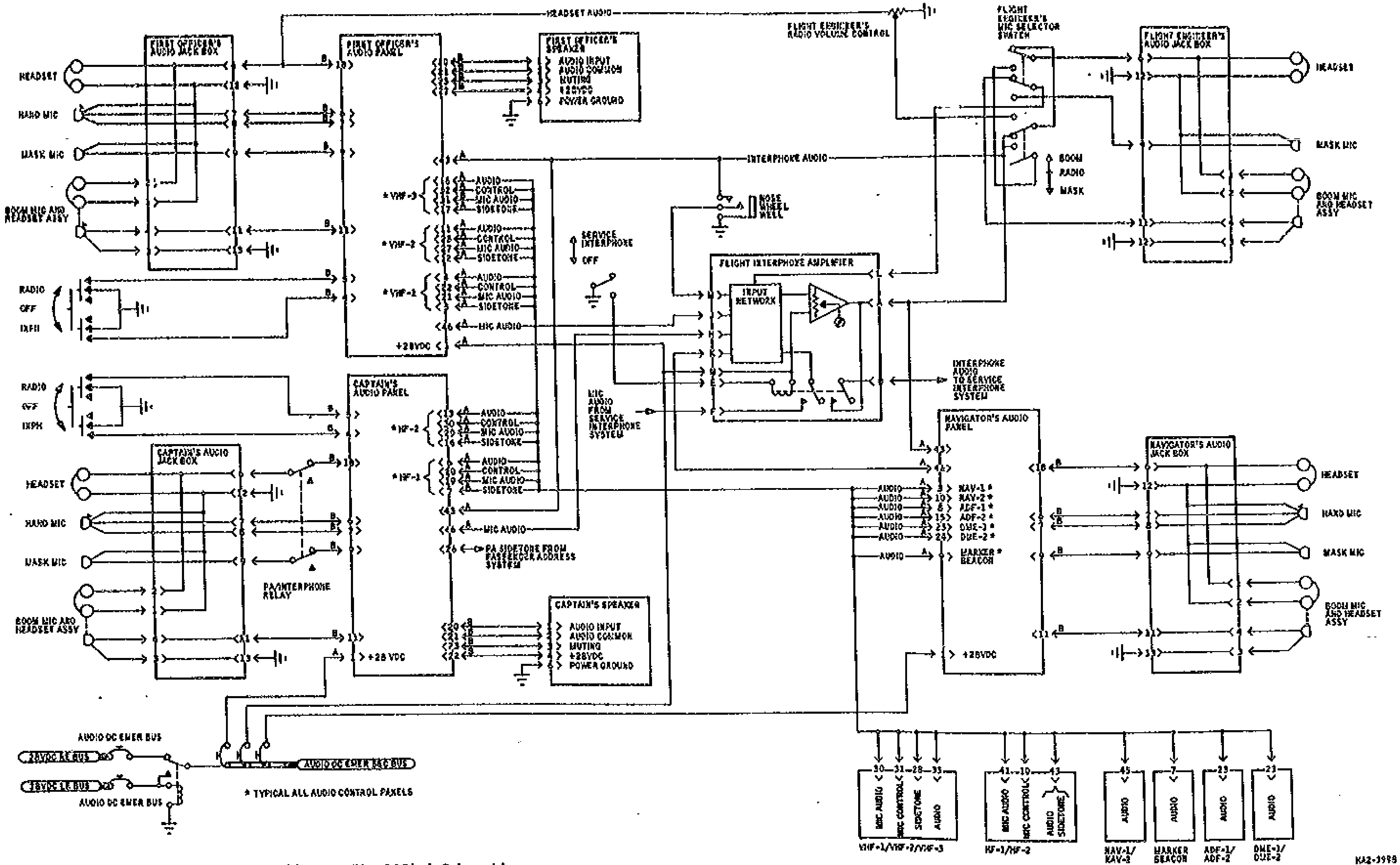
F. A jack outlet installed in the nose wheel well and connected directly into the flight interphone amplifier, permits communication between flight crew and ground crew during dispatch operations. Communication with this station is enabled whenever interphone is selected on an audio control panel.

G. Control switches on the captain's and first officer's control wheels provide microphone control for either interphone or radio operation. In the interphone position the switches complete the audio input circuit; in the radio position they provide, in addition, a control signal to key the operating HF or VHF transmitter.

H. At the flight engineer's station, a microphone selector switch permits the flight engineer to select either the boom or mask microphone for communication on interphone audio. The selector switch in the center position enables the flight engineer to monitor the radio output selected on the first officer's panel.

I. The flight interphone amplifier is installed in the radio rack on shelf 5 and provides the necessary audio amplification for flight interphone communications. The amplifier, a transistorized unit, consists of a chassis with rear mounted electrical connector and a dust cover. Functionally the amplifier consists of a 2 stage cascaded voltage amplifier with a 2 stage cathode follower output. The amplifier is connected directly to the audio control panels and the nose wheel well jack outlet. A resistive input network provides isolation for the multiple inputs supplied to the amplifier. One amplifier input and output is relay controlled and functions to connect the service interphone and flight interphone together when the relay is energized. The service interphone control switch is connected in the relay control circuit and energizes the relay when the service interphone is turned off.

J. Loudspeakers are installed at the captain's and first officer's stations. Each loudspeaker contains a transistorized audio amplifier, volume control, muting relay, and on/off switch, and speaker. The volume control is internally mounted and audio level is preset. The muting relay is energized by the associated push-to-talk switch and mutes the speaker to prevent feedback to the microphone. The on/off controls input power to the speaker amplif'er. All components contained in the loudspeaker are mounted on the front cover panel and the perforated back cover is provided for component cooling and protection. Electrical connections are made through a receptacle mounted on the back cover.



Audio Integrating -- Simplified Schematic
Figure 1

2. Operation Audio Integrating

A. For interphone operation, the microphone selector switch is placed in the interphone position and a microphone control switch is pressed muting applicable flight compartment loudspeaker, interphone is routed through the microphone selector switch to the flight interphone amplifier. The amplified audio is routed to the interphone audio select switch through the isolation resistor, volume control to the isolation amplifier. The audio output is connected to the headset audio network, to the speaker switch and the interphone control relay. When the mask microphone is used to supply interphone audio input the boom/mask switch opens the speaker muting circuit and bypasses the speaker audio switch.

B. For transceiver operation, the microphone selector switch is placed to the applicable transceiver position and the applicable audio switch is placed in the up position. The boom/mask microphone switch is placed to the boom or mask position when either of these microphones are used. Employing either boom or mask microphone and pressing applicable control wheel switch or control panel switch to radio applies the microphone output to the control panel. Microphone outputs to the transceiver mode control are routed through the selector switch to the transceiver. The transceiver is switched to the transmit mode of operation.

C. To monitor the audio inputs to the audio control panel, place the volume control to the midposition and the applicable audio selector switch to the on position. The audio outputs of the communication transceivers, navigation receivers, and the interphone amplifier are applied to the audio control panel. Each audio input is routed through an isolation resistor, volume control, and the isolation amplifier to the respective station head set or boomset. The audio output is also routed through the control panel speaker switch to the respective flight compartment speakers.

3. To Operate System

A. To Operate Interphone

(1) Energize electrical buses.

(2) Place controls to positions indicated.

Control	Position
Audio control panel interphone microphone select switch	Pressed
Volume control	Midposition

Control	Position
Interphone audio switch	On
Audio control panel speaker switch	On
Flight compartment speaker amplifier switches	On
Headset push-to-talk switch	Pressed
NOTE: For boom or mask microphone operation, perform the following steps in lieu of the one directly preceding.	
Audio control panel boom/mask switch	Boom or mask as applicable
Control wheel or control panel push-to-talk switch	Interphone

(3) Speak into microphone and adjust volume control to a comfortable level.

B. To Operate Transceivers

(1) Energize electrical buses.

(2) Place controls to positions indicated.

Control	Position
Audio control panel microphone select switch	Desired transceiver
Volume control	Midposition
Audio switch	Desired transceiver on
Audio control panel speaker switch	On

Control	Position
Speaker amplifier switch	On
Handset push-to-talk switch	Pressed
NOTE: For boom or mask microphone operation, perform the following steps in lieu of the one directly preceding.	
Audio control panel boom/mask switch	Boom or mask as applicable
Control wheel or control panel push-to-talk switch	Radio

(3) Speak into microphone and adjust volume control to a comfortable level.

AUDIO INTEGRATING - DESCRIPTION AND OPERATION

1. General

A. The audio integrating system provides a means of selecting and monitoring the audio outputs of the communication receivers, navigation receivers, and the audio integrating amplifier. In addition the audio integrating system provides a means of directing microphone outputs to the communication transmitters and the audio integrating amplifier. (See Figure 1.) The audio integrating system consists of audio control panels, headsets and microphones, jack outlets, control switches, an audio amplifier, and flight compartment loudspeakers.

B. The audio control panels control the audio integrating system. Control panels are provided at the captain's, first officer's, and the navigator's station. Each control panel contains audio selector switches, an auxiliary switch, microphone selector switch, isolation resistors, an isolation amplifier, a volume control, automatic direction finding switches, a marker beacon and speaker switch. A switch at the flight engineer's panel permits monitoring the audio selected at either the captain's or the first officer's station. This switch does not permit independent selection of system audio inputs as provided at captain's or first officer's audio control panels.

C. The audio selector switches are placed in the up position to select HF and VHF communication receiver audio and sidetone, VHF navigation receiver audio, marker beacon receiver audio, and transponder audio. The selected audio inputs are connected to the normal audio circuits which routes the selected audio through the isolation resistor, audio selector switch, and volume control to the isolation amplifier input. Amplifier output is routed to the speaker switch and through the volume control to the headset. In addition, the audio selector switches are an integral part of the auxiliary audio circuit. In conjunction with the auxiliary audio circuits, the audio selector switches are series connected from left to right when the switches are in the down position. When an audio switch is placed in the up position, all other audio selector switches are isolated from the auxiliary circuit and the selected audio is routed through the audio switch directly to the auxiliary switch.

D. The auxiliary switch provides a means of selecting normal or auxiliary audio circuit monitoring. When the switch is in the up position, normal audio monitoring is enabled. However when the switch is in the auxiliary down position only one selected circuit may be monitored; all other circuits will be disabled. Audio from the selected auxiliary circuit bypasses the isolation circuits and is supplied directly to the auxiliary switch for distribution to the system.

E. The microphone selector switch provides a means of selecting any of five microphone operating configurations. A spring-loaded call position is used to operate a relay in the captain's or first officer's audio control panel to actuate the cabin attendant's chime. Microphone switch positions

enable microphone audio and control to be supplied to the selected system. Transmitter control functions, HF-1, HF-2, VHF-1, and VHF-2, enable routing of flight crew microphone audio and control to the selected HF or VHF system. The INT position enables routing of microphone audio and control to the audio integrating amplifier.

F. An isolation resistor is placed in series with each audio input to the audio control panel to prevent interference between flight crew stations. The resultant signal loss caused by the isolation resistor is regained by the isolation amplifier. The isolation amplifier amplifies all audio inputs to the control panel when normal operation is selected.

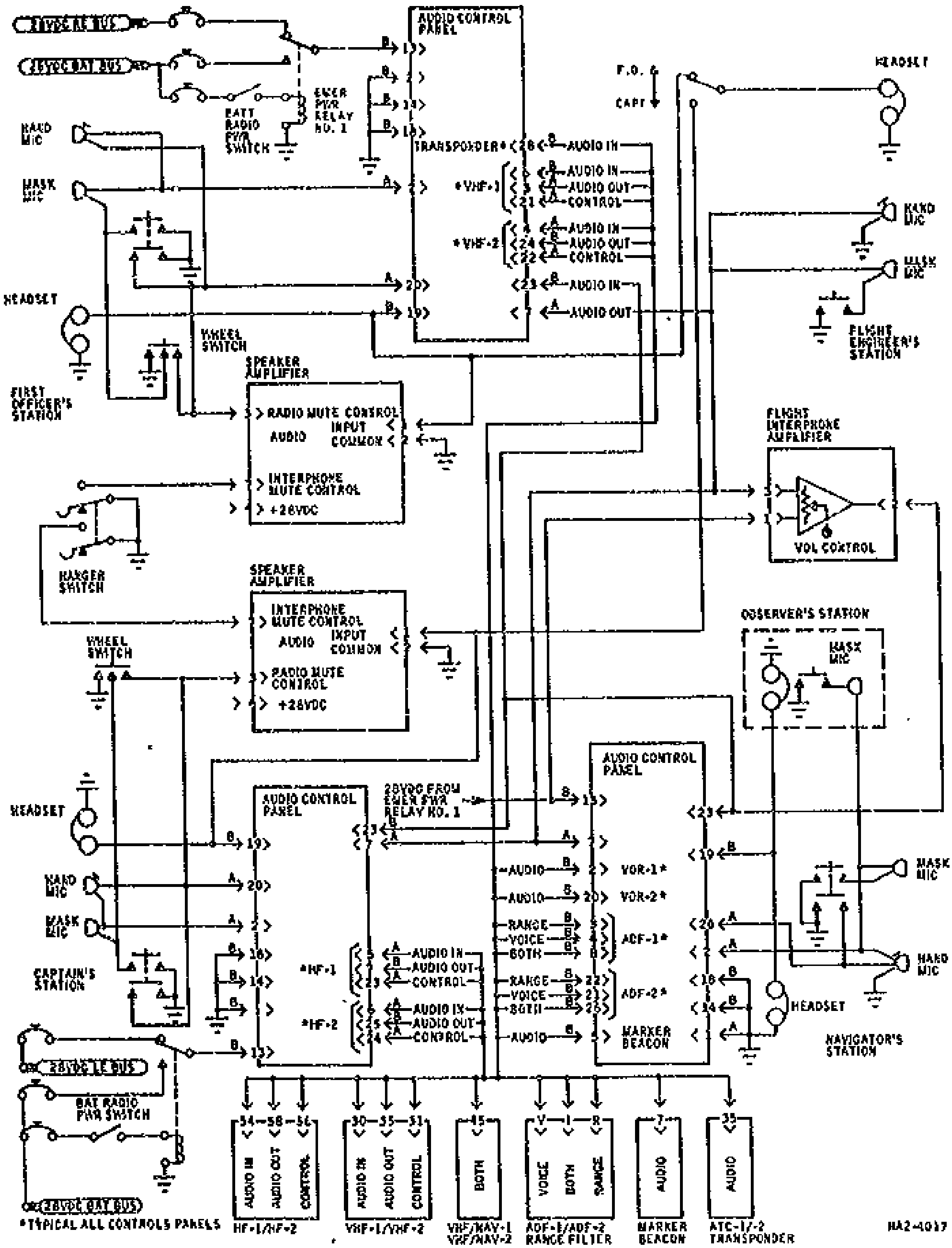
G. Microphone jacks for headsets and hand-held microphones are located at the captain's, first officer's, flight engineer's and navigator's stations. A headset jack is located at the observer's station. All flight crew stations are equipped with jacks for mask microphones. Push-to-talk switches on the captain's and first officer's control wheel provide control of their respective microphones. A selector switch on the flight engineer's panel permits selection of either captain's or first officer's audio for monitoring.

H. The audio integrating amplifier provides the necessary audio amplification for flight crew interphone communications. The amplifier contains an input transformer, input gain control, transistorized audio amplifier, and an output transformer. The amplifier input is connected to the audio control panels, microphone relays, nosewheel well jack outlet, and the passenger address emergency announce switch. The amplifier output is connected to the audio control panels and to the nosewheel well jack outlet. A screwdriver access hole is provided through the amplifier to adjust the input gain control. The amplifier is installed in the inboard radio rack on shelf 6 and electrical power is supplied through the captain's audio circuit breaker located on the left dc emergency bus.

I. The flight compartment loudspeakers provide the captain and first officer a means of monitoring the audio integrating system without the use of the headset. Loudspeakers are installed in the overhead at the captain's and first officer's station. Each loudspeaker contains a transistorized audio amplifier, muting relay, volume control, and a speaker. The audio amplifier amplifies the audio outputs from the associated station audio control panel. The muting relay mutes the speaker to prevent feedback to the microphone. The volume control is located in the center of the speaker grill and is rotated to adjust the speaker volume.

2. Operation

A. For interphone operation, the microphone selector switch is placed in the interphone position and the microphone control is pressed muting the applicable flight compartment speaker. Interphone audio is routed through the microphone selector switch to the flight interphone amplifier. The



Audio Integrating -- Simplified Schematic
Figure 1

amplified audio is routed through an isolation resistor and the microphone selector switch to the isolation amplifier. Output from the amplifier is routed to the auxiliary and speaker switches, and through the volume control to the headset.

B. For radio operation, the microphone selector switch is placed to the desired position and the applicable audio selector switch is placed in the up position. Employing the hand microphone and pressing the push-to-talk switch applies microphone output to the control panel. Microphone outputs to the transmitter control are routed through the microphone selector switch to the transmitter. Transmitter control relays are energized and the selected transmitter operates.

C. To monitor the audio inputs to the audio control panel, place the volume control to the midposition and the applicable audio selector switch to the on position. The audio outputs of the communication receivers, navigation receivers, and interphone amplifier are applied to the audio control panel. Each audio input is routed through an isolation resistor, isolation amplifier, and the volume control to the respective station headset or speaker.

D. For auxiliary operation, the normal/auxiliary switch is placed in the auxiliary position. The control panel isolation amplifier is bypassed. Audio monitoring is selected one at a time by placing the applicable audio selector switch in the on position. The selected audio is connected directly to the headset or speaker through the normal/auxiliary switch.

3. To Operate System

A. To Operate Interphone

(1) Energize electrical buses.

(2) Place interphone switch to flight interphone position.

(3) Place controls to position indicated.

Control	Position
Audio control panel microphone select switch	Interphone
Volume control	Midposition
Microphone push-to-talk switch	Pressed

(4) Speak into hand microphone and adjust volume control to a comfortable level.

B. To Operate Transceivers

(1) Energize electrical buses.

(2) Place controls to position indicated.

Control	Position
Audio control panel microphone select switch	Desired transceiver
Volume control	Midposition
Audio switch	Desired transceiver on
Microphone push-to-talk switch	Pressed

(3) Speak into hand microphone and adjust volume control to a comfortable level.

AUDIO INTEGRATING - DESCRIPTION AND OPERATION

1. General

A. The audio integrating system provides a means of selecting and monitoring the audio outputs of the communication receivers, navigation receivers, and the interphone amplifier. In addition, the audio integrating system provides a means of directing audio outputs to the communication transmitters and the interphone amplifier (see Figure 1). The system consists of audio control panels, headsets and microphones, jack outlets, an audio amplifier, speaker amplifiers with 2 flight compartment loudspeakers.

B. The audio control panels are used to select and regulate audio integrating system functions. Audio control panels are provided at captain's, first officer's, navigator's, and flight engineer's stations. Each control panel contains audio level controls, aural navigation selector switches, transmitter selector switches, an isolation amplifier, a control relay, and a speaker level control with on/off switch.

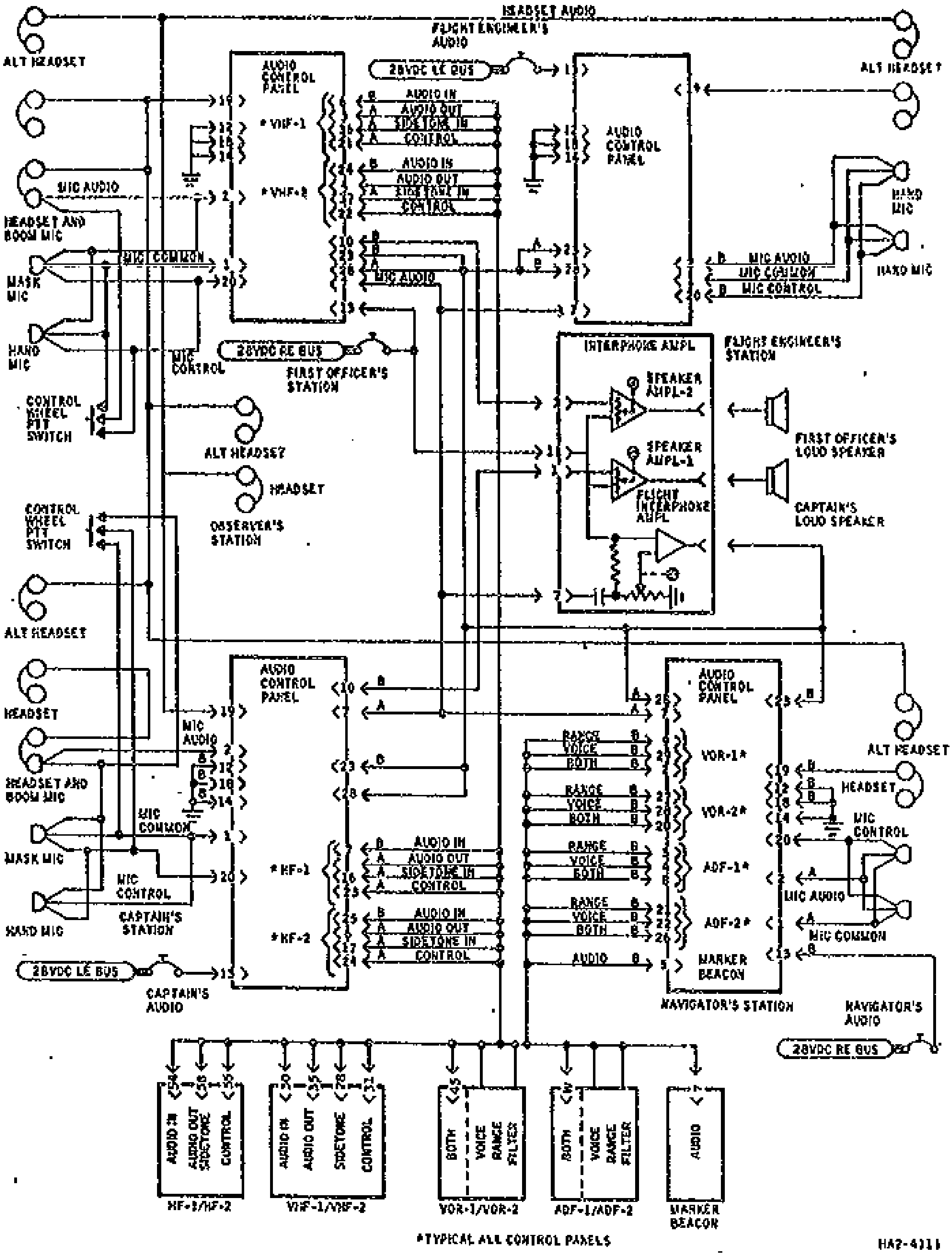
C. The audio level controls provide selection as well as level adjustment for all inputs from the communication or navigation receivers. An isolation resistor is installed in series with each audio level control to prevent crosstalk between channels. Each audio level control is in the off position when rotated fully counterclockwise. A loudspeaker level control is installed on the first officer's and captain's control panel to control the level of associated flight compartment speakers or turn off as required. The ADF and VOR selector switches are three position and select range, voice, or both, from each of the navigation system inputs. The ADF and VOR selector switches route the selected signal to its associated audio level control.

D. The transmitter selector switch, a 5 position pushbutton unit, selects microphone and audio outputs for the communication transmitters and interphone amplifier. In addition, the transmitter selector switch connects transmitter and interphone sidetone to the audio integrating system.

E. An isolation amplifier installed in each control panel amplifies all audio input signals sufficiently to compensate for signal loss in the isolation networks.

F. The control relay is energized by the control signal generated by pressing microphone push-to-talk switches. When energized, the control relay bypasses the speaker level control and inserts a preset resistance in series with speakers circuit to mute the associated flight compartment speaker. The control relay also shifts communication monitoring from receiver audio to selected transmitter sidetone.

G. Headsets and hand held microphones are located at the captain's, first officer's, flight engineer's and navigator's station. A headset is located at the observer's station. Mask microphone jacks are located at all flight crew stations except the observer's. Alternate headset jacks,



Audio Integrating -- Simplified Schematic
Figure 1

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wired in parallel with another station, are installed in all flight crew stations to enable audio monitoring even though one power bus may have failed. Headset and boom microphone assemblies are installed at the first officer's and captain's station. Microphone control for these units is accomplished through control switches located on the outboard horn of each control wheel.

H. The interphone amplifier is installed in the radio rack on shelf 3 and provides the necessary audio amplification for the audio integrating and interphone systems. The amplifier is of modular construction and consists of a chassis with a rear mounted connector, front panel, dust cover, 2 interphone amplifier modules, and 2 speaker amplifiers. One interphone amplifier module and the 2 speaker modules operate with the audio integrating system while the remaining interphone module operates in conjunction with the interphone system. The amplifier module used with the audio integrating system is a 2 stage audio amplifier with preset volume control mounted externally to the module in the amplifier chassis. The 2 speaker amplifiers are pushpull transformer coupled units with preset gain controls mounted within the amplifier module. Interphone input and output signals are connected to the system through the control panels. Speaker amplifier input signals are supplied through the captain's and first officer's control panel and the output routed to the associated flight compartment loudspeaker.

I. The flight compartment loudspeakers provide the captain and the first officer a means of monitoring the audio integrating system without using headsets. The loudspeakers are installed in the overhead at the captain's and first officer's station.

2. <u>Operation</u>

A. For interphone operation, the interphone microphone selector switch is pressed and the interphone audio level control is rotated clockwise. A microphone push-to-talk switch is pressed, muting the applicable flight compartment speaker. Microphones associated with the navigator's and the flight engineer's station do not mute flight compartment speakers. Microphone audio is routed through the interphone selector switch to the flight interphone amplifier. The amplified audio is routed through the isolation and interphone audio level control to the isolation amplifier. Output audio is routed to the flight compartment headsets and applicable flight compartment speaker when the control panel speaker control is on. Interphone sidetone from the interphone amplifier is routed through the control relay to all headsets associated with the microphone station in use.

B. For radio operation, the applicable transmitter microphone select switch is pressed and the applicable audio level control is rotated clockwise. A microphone push-to-talk switch is pressed, muting the associated flight compartment loudspeaker. Microphones associated with the navigator's audio control panel do not mute flight compartment loudspeakers. Audio is routed through the applicable transmitter microphone selector switch. Microphone audio from the control panel is supplied to the selected HF or

VHF system. Simultaneous with microphone audio a control signal is generated by the microphone push-to-talk switch that is used to key the selected HF or VHF transmitter. Transmitter sidetone from the operating transmitter is routed through the control relay to all headsets associated with the microphone station in use.

C. To monitor audio inputs to the audio control panel, the audio level control for the system to be monitored is placed in the midposition. Audio from the selected radio system, interphone, communications, or navigation are applied to the system through the isolation resistors and audio level controls then to the isolation amplifier. The outputs are applied to selected system headsets. To monitor audio inputs through the flight compartment speakers, select the system inputs as before. Position speaker audio level control to desired level on captain's or first officer's audio control panel.

3. To Operate System

A. To Operate Interphone

(1) Energize electrical buses.

(2) Place controls to positions indicated.

Control	Position
Audio control panel interphone select switch	Pressed
Interphone audio level control	Midposition
Microphone push-to-talk switch	Pressed

(3) Speak into microphone and adjust volume to comfortable level.

B. To operate radio

(1) Energize electrical buses.

(2) Place controls to positions indicated.

Control	Position
Audio control panel transmitter selector switch	Desired transmitter
Applicable transmitter audio level control	Midposition

AUDIO INTEGRATING - DESCRIPTION AND OPERATION

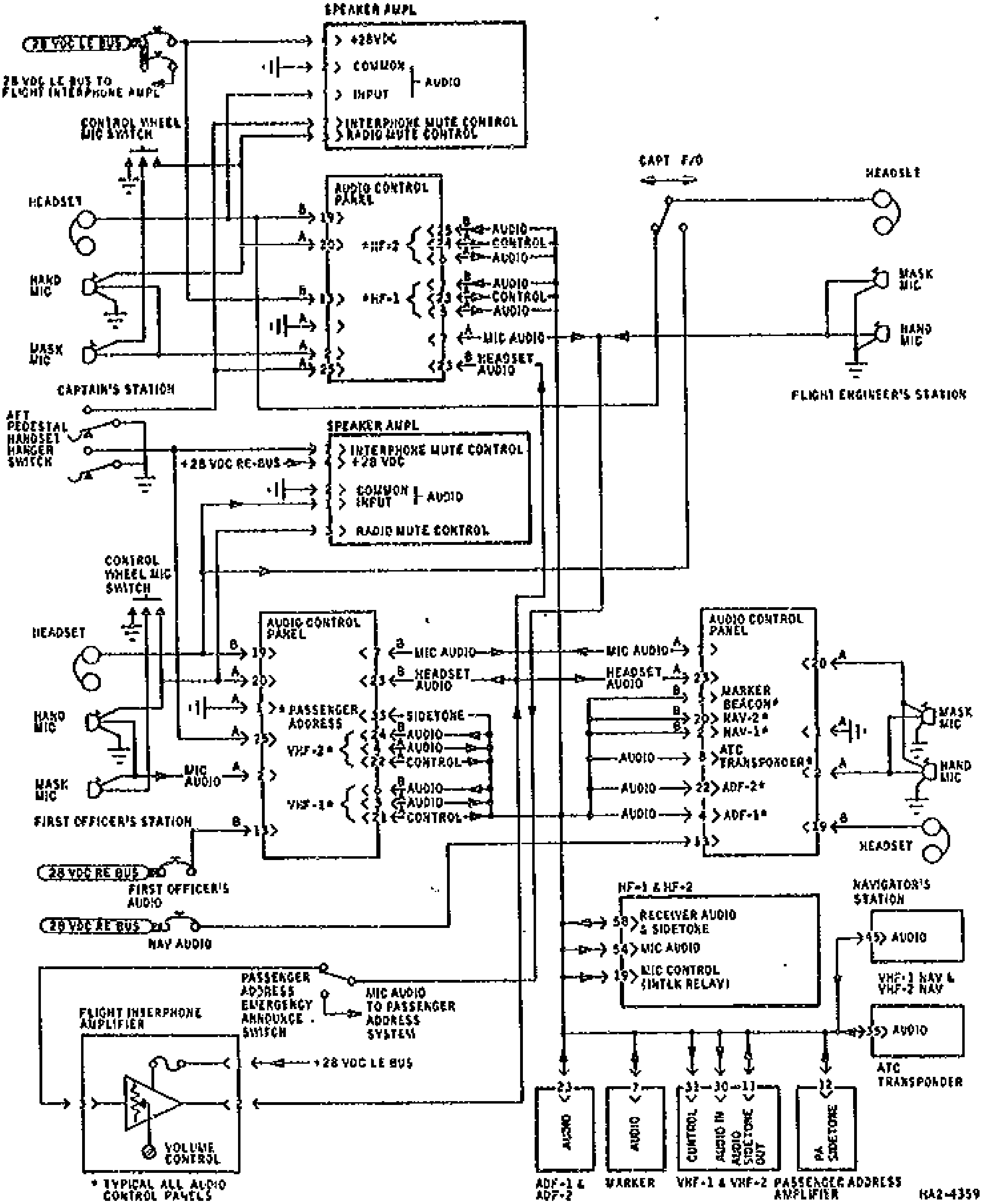
1. General

   A. The audio integrating system provides a means of selecting and monitoring the audio outputs of the communication receivers, navigation receivers, the audio integrating amplifier and the passenger address system. In addition the audio integrating system provides a means of directing microphone outputs to the communication transmitters, the audio integrating amplifier and the passenger address system. (See Figure 1.) The audio integrating system consists of audio control panels, headsets and microphones, jack outlets, control switches, an audio amplifier, and flight compartment loudspeakers.

   B. The audio control panels control the audio integrating system. Control panels are provided at the captain's, first officer's, and the navigator's station. Each control panel contains audio selector switches, an emergency switch, microphone selector switches, isolation resistors, an isolation amplifier, a volume control, automatic direction finding switches, a marker beacon VHF-NAV selector switches a filter switch and audio-filter. A switch at the flight engineer's panel permits monitoring the audio selected at either the captain's or the first officer's station. This switch does not permit independent selection of system audio inputs as provided at captain's or first officer's audio control panels.

   C. The audio selector switches are placed in the up position to select HF and VHF communication receiver audio and sidetone, VHF navigation receiver audio, marker beacon receiver audio, automatic direction finder receiver audio, flight compartment interphone audio and passenger address sidetone. The selected audio inputs are connected to the normal audio circuits which routes the selected audio through the isolation resistor, audio selector switch, and volume control to the isolation amplifier input. In addition, the audio selector switches are an integral part of the emergency audio circuit. In conjunction with the emergency audio circuits, the audio selector switches are series connected from left to right when the switches are in the down position. When an audio switch is placed in the up position, all other audio selector switches are isolated from the emergency circuit and the selected audio is routed through the audio switch directly to the emergency switch.

   D. The emergency switch provides a means of selecting normal or emergency audio circuit monitoring. When the switch is in the down position, normal audio monitoring is enabled. However when the switch is in the emergency up, position only one selected circuit may be monitored; all other circuits will be disabled. Audio from the selected emergency circuit bypasses the isolation circuits and is supplied directly to the emergency switch for distribution to the system.



Audio Integrating -- Simplified Schematic
Figure 1

E. The microphone selector switch provides a means of selecting any one of five microphone operating configurations. The selector switch is a five section pushbutton unit that locks each pushbutton as it is pressed and releases a previously activated pushbutton. Each switch enables microphone audio and control to be supplied to the selected system. Four transmitter control functions, VHF-1, HF-1, VHF-2, and HF-2, enable routing of flight crew microphone audio and control to the selected VHF or HF system. The INT position enables routing of microphone audio and control to the audio integrating amplifier.

F. An isolation resistor is placed in series with each audio input to the audio control panel to prevent interference between flight crew stations. The resultant signal loss caused by the isolation resistor is regained by the isolation amplifier. The isolation amplifier amplifies all audio inputs to the control panel when normal operation is selected.

G. Microphone jacks for headsets and hand-held microphones are located at the captain's, first officer's flight engineer's and navigator's stations. A headset jack is located at the observer's station. All flight crew stations are equipped with jacks for mask microphones. Push-to-talk switches on the captain's and first officer's control wheel provide control of their respective microphones. A selector switch on the flight engineer's panel permits selection of either captain's or first officer's audio for monitoring.

H. The interphone amplifier is installed in the radio rack on shelf 1, and provides the necessary audio amplification for flight and maintenance communications. The amplifier contains an input transformer, input gain control, transistorized audio amplifier, and an output transformer. A screwdriver access hole is provided through the amplifier chassis to adjust the input gain control. The amplifier is connected directly to the jack outlets and connected to the handsets by the passenger address/interphone control relays. Electrical connections are made through a receptacle mounted on the amplifier chassis. Electrical power is supplied by the left dc emergency bus.

I. Loudspeakers are installed at the captain's and first officer's stations. Each loudspeaker contains a transistorized audio amplifier, volume control, muting relay, and a speaker. The volume control is external and adjusts the loudspeaker output level. The muting relay is energized by the associated station push-to-talk switch and mutes the speaker to prevent feedback to the microphone. The muting relay is also energized by a speaker muting circuit which is activated when the flight compartment service interphone handset is lifted from the hanger switch. All of the components contained in the loudspeaker are mounted on the front cover panel and a perforated back cover is provided for component cooling and protection. Electrical connections are made through a receptacle mounted on the back cover.

J. A microphone control switch is installed on the outboard horn of each control wheel. Actuation of the control wheel switch energizes the audio control panel microphone relay and mutes the associated station loudspeaker.

2. Operation

A. For interphone operation, the interphone microphone selector switch is pressed, the audio selector switch is placed in the up position, and a microphone control switch is pressed, muting the flight compartment speakers. Interphone audio is routed through the microphone selector switch to the flight interphone amplifier. The amplified audio is routed to the interphone audio selector switch through the volume control to the isolation amplifier. Output audio is connected to the headset or to the applicable overhead flight compartment speaker amplifier.

B. For radio operation, applicable microphone selector switch is pressed and the applicable audio selector switch is placed in the up position. Employing the hand microphone and pressing the push-to-talk switch applies the microphone output to the control panel. Microphone outputs to transmitter control are routed through the microphone selector switch to the transmitter. Transmitter control relays are energized and the selected transmitter operates.

C. To monitor the audio inputs to the audio control panel, place the volume control to the midposition and the applicable audio selector switch to the up position. The audio outputs of the communication receivers, navigation receivers, and interphone amplifier are applied to the audio control panel. Each audio output is routed through an isolation resistor, volume control, and the isolation amplifier to the respective station headset or speaker.

D. For emergency operation, the emergency switch is placed to the emergency position. The control panel isolation amplifier is bypassed. Audio monitoring is selected one function at a time by placing the applicable audio selector in the up position. The selected audio is connected directly to the headset or speaker through the emergency switch.

3. To Operate System

A. To Operate Interphone

(1) Energize electrical buses.

(2) Place controls to position indicated.

Control	Position
Audio control panel microphone select switch	Interphone
Volume control	Midposition
Interphone audio switch	On
Microphone push-to-talk switch	Pressed

(3) Speak into hand microphone and adjust volume control to a comfortable level.

B. To Operate Transceivers

(1) Energize electrical buses.

(2) Place controls to position indicated.

Control	Position
Audio control panel microphone select switch	Desired transceiver
Volume control	Midposition
Audio switch	Desired transceiver on
Microphone push-to-talk switch	Pressed

(3) Speak into hand microphone and adjust volume control to a comfortable level.

AUDIO INTEGRATING - DESCRIPTION AND OPERATION

1. General

A. The audio integrating system provides a means of selecting and monitoring the audio outputs of the communication receivers, the navigation receivers, the audio integrating amplifier and the interphone system. In addition, the audio integrating system provides circuits for directing microphone outputs to the communication transmitters, the audio integrating amplifier, the interphone system, and the passenger address system. (See Figure 1.) The audio integrating system consists of audio control panels, headsets, an and microphones, jack outlets, control switches, and audio amplifier, and flight compartment speaker amplifiers.

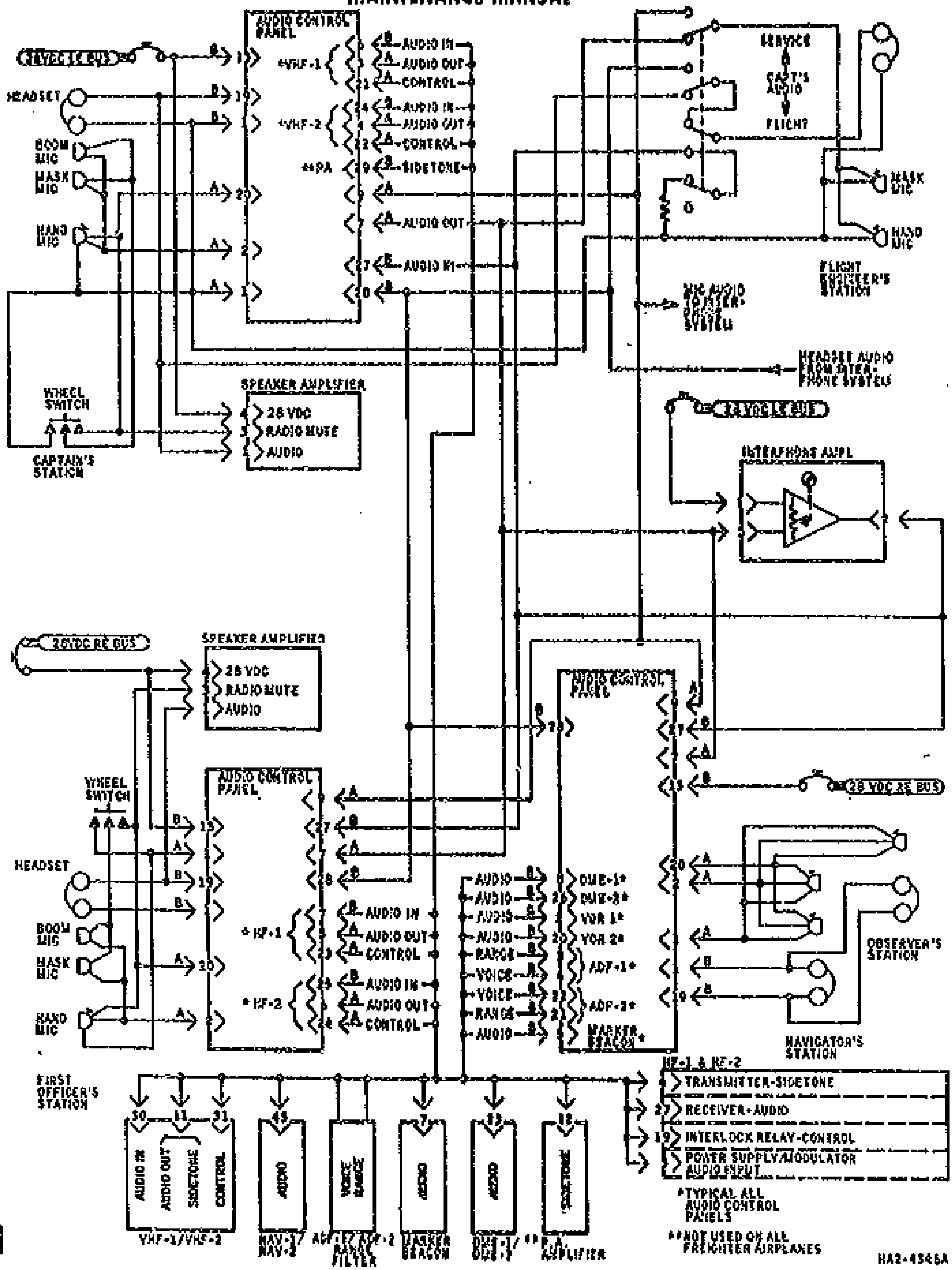
NOTE: Passenger address system is not applicable to the all freighter configuration.

B. The audio control panels control the functions of the audio integrating system. An audio control panel is installed at the captains' first officer's and the navigator's station. Each control panel contains audio selector switches, an emergency switch, a microphone selector switch, isolation resistors, an isolation amplifier, and volume control. An audio control panel is not installed at the flight engineer's station, instead, a switch at the flight engineer's station selects audio through the captain's audio control panel, from the audio integrating amplifier or the interphone system.

C. The audio selector switches are placed in the up position to select HF and VHF communication receiver audio and sidetone, VHF navigation receiver audio, marker beacon receiver audio, automatic direction finder receiver audio, flight compartment interphone audio, service interphone audio and passenger address sidetone. The selected audio outputs are connected to the normal audio circuits through the isolation resistors to the volume control and the isolation amplifier. The volume control regulates the input to the isolation amplifier by providing a variable shunt to signal ground. In addition, the audio selector switches are an integral part of the emergency audio circuit. In conjunction with the emergency audio circuit, the audio selector switches are series connected when the switches are in the down position. When an audio switch is placed in the up position, all other selector switches are isolated from the emergency circuit and the selected audio is routed through the audio switch directly to the emergency switch.

D. The emergency switch provides a means of selecting normal or emergency circuit monitoring. When the switch is in the down position, normal audio monitoring is enabled. However, when the switch is in the emergency position only one selected circuit may be monitored; all other circuits will be disabled. Audio from the selected circuit bypasses the isolation circuits and is supplied directly to the emergency switch for distribution to the system.

E. The microphone selector, a rotary switch, provides a means of selecting any one of the microphone operating configurations. Each switch position enables microphone audio and control to be supplied to the selected system. Four transmitter control functions, HF-1, VHF-1, HF-2 and VHF-2, enable



Audio Integrating -- Simplified Schematic
Figure 1

routing of flight crew microphone audio and control to the selected HF or VHF system. The service interphone, flight interphone and passenger address positions enable routing of microphone audio and control to the interphone system, audio integrating system and the passenger address system respectively.

F. An isolation resistor is placed in series with each audio input to the audio control panel to prevent interference between flight crew stations. The resultant signal loss caused by the isolation resistors is regained by the isolation amplifier. The isolation amplifier amplifies all audio inputs applied to the control panel when normal operation is selected.

G. Microphone jack outlets for headsets and hand held microphones are located at the captain's, first officer's, flight engineer's, and navigator's station. Jack outlets for boom microphones are located at the captain's and first officer's station. A headset jack outlet is located at the observer's station, all flight crew stations are equipped with jack outlets for mask microphones. Push-to-talk switches on the captain's and first officer's control wheels provide control of their respective microphones. A switch at the flight engineer's station permits selection of captain's audio, service interphone, or flight interphone.

H. The audio integrating amplifier provides the necessary audio amplification for flight crew interphone communications. The amplifier contains an input transformer, input gain control, transistorized audio amplifier, and an output transformer. A screwdriver access hole is provided through the amplifier case to adjust the input gain control. The amplifier is installed in the inboard radio rack on shelf 1 and electrical power is supplied the flight interphone circuit breaker located on the left dc emergency bus.

I. The flight compartment loudspeakers provide the captain and first officer a means of monitoring the audio integrating system without the use of their headsets. Each loudspeaker contains a transistorized audio amplifier, muting relay, volume control, and loudspeaker. The audio input to each speaker amplifier is supplied through the associated station audio control panel. The muting relay mutes the speaker to prevent feedback to the microphone. The volume control is located in the center of the speaker grill and is rotated to adjust speaker volume.

2. Operation

A. For audio integrating interphone operation the microphone selector is set to flight interphone position, the flight interphone audio selector switch is placed in the up position, and a microphone control switch is pressed, muting the applicable flight compartment loudspeaker. Interphone audio is routed through the microphone selector switch to the audio integrating amplifier. The amplified audio is routed to the flight interphone selector switch and isolation resistor to the volume control and the isolation amplifier. Output audio is connected to the headset or applicable flight compartment loudspeaker.

B. For radio operation, the microphone and audio selector switches are set to an HF or VHF system. Employing microphone and pressing microphone control switch applies the microphone output to the audio control panel. Microphone outputs to transmitter control are routed through the microphone selector switch to the applicable transmitter. Transmitter control relays energize and the transmitter operates.

C. To monitor the audio inputs to the control panel, place the volume control to midposition and the applicable audio selector switch to the up position. The audio outputs of the communication, navigation receivers, service interphone system, passenger address system, and the audio integrating amplifier are applied to the audio control panel. Each output is routed through an isolation resistor to the volume control and the isolation amplifier. The amplifier output is routed to the respective headset or loudspeaker.

D. For emergency operation, the emergency switch is placed to the emergency position. The audio control panel isolation circuits are bypassed and the audio signal passes directly to the audio control panel output. Audio monitoring is selected one function at a time by placing the applicable audio selector switch in the up position. The selected audio is connected directly to the loudspeaker or headset through the emergency switch.

3. To Operate System

A. To Operate Interphone

(1) Energize electrical busses.

(2) Place controls to position indicated.

Control	Position
Audio control panel microphone select switch	Flight interphone
Volume control	Midposition
Flight interphone audio switch	On
Microphone push-to-talk switch	Pressed

(3) Speak into hand microphone and adjust volume control to a comfortable level.

B. To Operate Transmitters

(1) Energize electrical buses.

(2) Place controls to position indicated.

Control	Position
Audio control panel microphone select switch	Desired radio system on
Volume control	Midposition
Audio switch	Desired radio system on
Microphone push-to-talk switch	Pressed

(3) Speak into hand microphone and adjust volume control to a comfortable level.

AUDIO INTEGRATING - DESCRIPTION AND OPERATION

1. General

A. The audio integrating system provides a means of selecting and monitoring the audio outputs of the communication transceivers, navigation receivers, and the audio integrating amplifier. In addition, the audio integrating system provides a means of directing microphone outputs to the communication transceivers and the audio integrating amplifier (See Figure 1). The audio integrating system consists of audio control panels, headsets and microphones, jack outlets, control switches, audio amplifier, and flight compartment loudspeakers.

B. The audio control panels control the audio integrating system. A control panel is provided at each flight crew station. Each control panel contains audio selector switches, microphone selector switch, isolation resistors, isolation amplifiers, volume control, and microphone control relays.

C. The audio selector switches are placed in the up position to select HF and VHF communication receiver audio and sidetone, VHF navigation receiver audio, automatic direction finder receiver audio, marker beacon receiver audio, distance measuring equipment receiver audio, and flight compartment interphone audio. The selected audio inputs are connected to the audio circuits which routes the selected audio through the isolation resistor, audio selector switch, and volume control potentiometer to the isolation amplifier input.

D. The microphone selector switch is a five position rotary switch placarded HF-1, HF-2, VHF-1, VHF-2, and INPH. The microphone selector switch is placed in a communication transceiver position to route flight crew microphone audio and transceiver mode control to the selected transceiver. The microphone selector switch is placed in the interphone position to direct flight crew microphone audio to the interphone amplifier.

E. An isolation resistor is placed in series with each audio input to the audio control panel to prevent interference between flight crew stations. The resultant signal loss caused by the isolation resistor is regained by the isolation amplifier. The isolation amplifier amplifies all audio inputs to the audio control panel. The volume control is mounted concentrically to the microphone selector switch and is rotated to adjust the audio circuit input level to the isolation amplifier. The AMP-1/AMP-2 selector switch provides a means of selecting either isolation amplifier. The microphone control relay is energized when an associated station microphone control switch is actuated. Actuation of the microphone relay routes transceiver mode control to the microphone selector switch.

F. Headsets and mask microphone jacks are located at the captain's, first officer's, flight engineer's, navigator's, and observer's stations. Push-to-talk control of the mask microphone for the captain and first officer is controlled by a 3-position switch in the outboard horns of the control

wheels. Push-to-talk switch assemblies, located on their respective panels, controls the mask microphones at the flight engineer's, nagivator's, and the observer's station. Hand-held microphone jacks are located at all stations except the observer's station.

G. The audio integrating amplifier provides the necessary audio amplification for flight crew interphone communications. The amplifier contains an input transformer, input gain control, transistorized audio amplifier, and an output transformer. Interphone input and output circuit signals are connected to the system through the audio control panels. A screwdriver access hole is provided through the amplifier to adjust the input gain control. The amplifier is installed in the inboard radio rack on shelf 6 and electrical power is supplied through the captain's audio circuit breaker located on the left dc emergency bus.

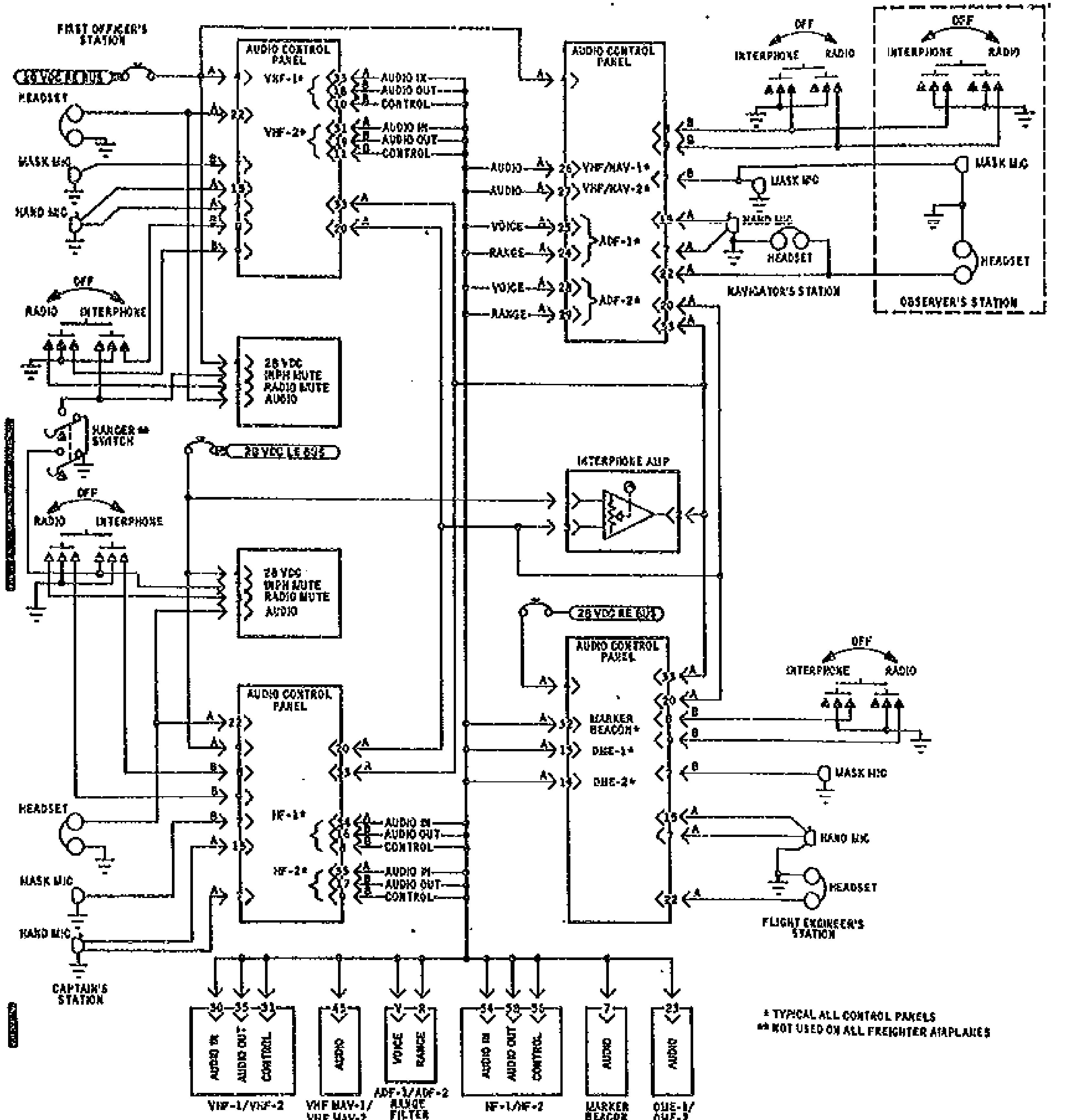
H. The flight compartment loudspeakers provide the captain and first officer a means of monitoring the audio integrating system without the use of the headset. Loudspeakers are installed in the overhead at the captain's and first officer's station. Each loudspeaker contains a transistorized audio amplifier, muting relay, volume control, and a speaker. The audio amplifier amplifies the audio outputs from the associated station audio control panel. The muting relay mutes the speaker to prevent feedback to the microphone. The volume control is located in the center of the speaker grill and is rotated to adjust the speaker volume.

2. Operation

A. For interphone operation, the microphone selector switch is placed to the interphone position and a microphone control switch is pressed muting the applicable flight compartment speaker. Interphone audio is routed through the microphone selector switch to the flight interphone amplifier. The amplified audio is routed to the interphone audio select switch through the volume control to the isolation amplifier. Output audio is connected to the headset and the applicable overhead flight compartment speaker amplifier.

B. For transceiver operation, the microphone selector switch is placed to the applicable transceiver position and the applicable audio switch is placed in the up position. Employing the hand microphone and pressing the push-to-talk switch applies the microphone output to the control panel. Microphone outputs to the transceiver mode control are routed through the microphone selector switch to the transceiver. The transceiver control relays are energized and the transceiver transfers to the transmitter mode of operation.

C. To monitor the audio inputs to the audio control panel, place the volume control to the midposition and the applicable audio selector switch to the on position. The audio outputs of the communication transceivers, navigation receivers, and interphone amplifier are applied to the audio control



Audio Integrating -- Simplified Schematic
Figure 1

panel. Each audio input is routed through an isolation resistor, volume control, and the isolation amplifier to the respective station headset, or speaker.

3. To Operate System

A. To Operate Interphone

(1) Energize electrical buses.

(2) Place controls to position indicated.

Control	Position
Audio control panel microphone select switch	Interphone
Volume control	Midposition
Interphone audio switch	On
Microphone push-to-talk switch	Pressed

(3) Speak into hand microphone and adjust volume control to a comfortable level.

B. To Operate Transceivers

(1) Energize electrical buses.

(2) Place controls to position indicated.

Control	Position
Audio control panel microphone select switch	Desired transceiver
Volume control	Midposition
Aúdio switch	Desired transceiver on
Microphone push-to-talk switch	Pressed

(3) Speak into hand microphone and adjust volume control to a comfortable level.

AUDIO INTEGRATING - DESCRIPTION AND OPERATION

1. General

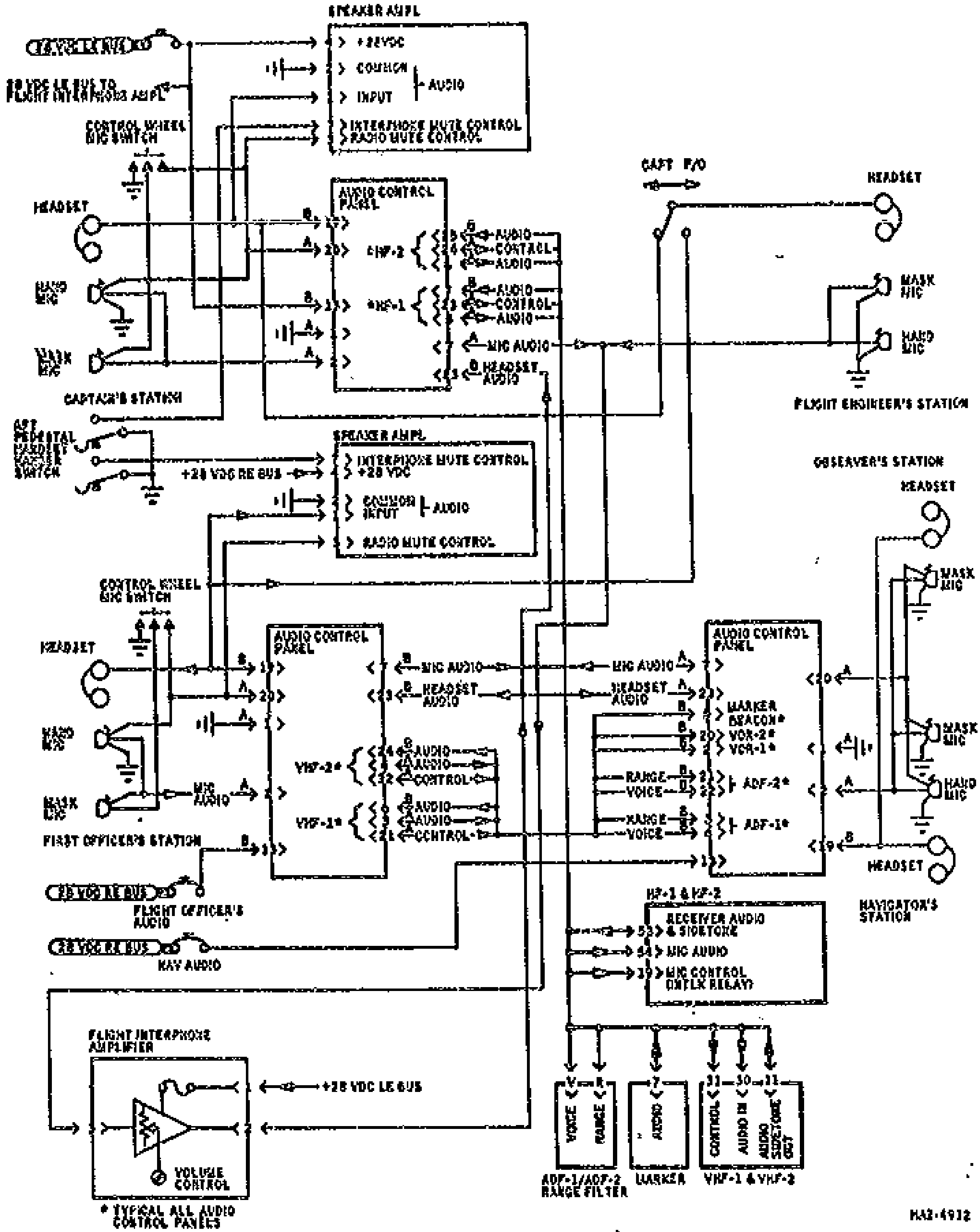
A. The audio integrating system provides a means of selecting and monitoring the audio outputs of the communication receivers, navigation receivers, and the audio integrating amplifier. In addition the audio integrating system provides a means of directing microphone outputs to the communication transmitters and the audio integrating amplifier. (See Figure 1.) The audio integrating system consists of audio control panels, headsets and microphones, jack outlets, control switches, an audio amplifier, and flight compartment loudspeakers.

B. The audio control panels control the audio integrating system. Control panels are provided at the captain's, first officer's, and the navigator's station. Each control panel contains audio selector switches, an emergency switch, microphone selector switches, isolation resistors, and isolation amplifier, a volume control, automatic direction finding switches, a marker beacon and VOR selector switches. A switch at the flight engineer's panel permits monitoring the audio selected at either the captain's or the first officer's station. This switch does not permit independent selection of system audio inputs as provided at captain's or first officer's audio control panels.

C. The audio selector switches are placed in the up position to select HF and VHF communication receiver audio and sidetone VHF navigation receiver audio, marker beacon receiver audio, automatic direction finder receiver audio, and flight compartment interphone audio. The selected audio inputs are connected to the normal audio circuits which routes the selected audio through the isolation resistor, audio selector switch, and volume control to the isolation amplifier input. In addition, the audio selector switches are an integral part of the emergency audio circuit. In conjunction with the emergency audio circuits, the audio selector switches are series connected from left to right when the switches are in the down position. When an audio switch is placed in the up position, all other audio selector switches are isolated from the emergency circuit and the selected audio is routed through the audio switch directly to the emergency switch.

D. The emergency switch provides a means of selecting normal or emergency audio circuit monitoring. When the switch is in the down position, normal audio monitoring is enabled. However, when the switch is in the emergency, up position only one selected circuit may be monitored; all other circuits will be disabled. Audio from the selected emergency circuit bypasses the isolation circuits and is supplied directly to the emergency switch for distribution to the system.

E. The microphone selector switch provides a means of selecting any one of five microphone operating configurations. The selector switch is a five section pushbutton unit that locks each pushbutton as it is pressed and releases a previously activated pushbutton. Each switch enables microphone audio and control to be supplied to the selected system. Four



Audio Integrating -- Simplified Schematic
Figure 1

transmitter control functions, VHF-1, HF-1, VHF-2, and HF-2, enable routing of flight crew microphone audio and control to the selected VHF or HF system. The INT position enables routing of microphone audio and control to the audio integrating amplifier.

F. An isolation resistor is placed in series with each audio input to the audio control panel to prevent interference between flight crew stations. The resultant signal loss caused by the isolation resistor is regained by the isolation amplifier. The isolation amplifier amplifies all audio inputs to the control panel when normal operation is selected.

G. Microphone jacks for headsets and hand-held microphones are located at the captain's, first officer's, flight engineer's and navigator's stations. A headset jack is located at the observer's station. All flight crew stations are equipped with jacks for mask microphones. Push-to-talk switches on the captain's and first officer's control wheel provide control of their respective microphones. A selector switch on the flight engineer's panel permits selection of either captain's or first officer's audio for monitoring.

H. The interphone audio amplifier is installed in the inboard radio rack on shelf 1 and provides the necessary audio amplification for flight personnel communications. The amplifier contains an input transformer, input gain control, transistorized audio amplifier, and an output transformer. A screwdriver access hole is provided through the amplifier chassis to adjust the input gain control. Electrical connections are made through a receptacle mounted on the amplifier chassis. The amplifier input and output are connected to the control relays by the audio signal wiring. Power is supplied by the 28-vdc left emergency bus.

I. Loudspeakers are installed at the captain's and first officer's stations. Each loudspeaker contains a transistorized audio amplifier, volume control, muting relay, and a speaker. The volume control is external and adjusts the loudspeaker output level. The muting relay is energized by the associated station push-to-talk switch and mutes the speaker to prevent feedback to the microphone. The muting relay is also energized by a speaker muting circuit which is activated when the flight compartment service interphone headset is lifted from the hanger switch. All of the components contained in the loudspeaker are mounted on the front cover panel and a perforated back cover is provided for component cooling and protection. Electrical connections are made through a receptacle mounted on the back cover.

J. A microphone control switch is installed on the outboard horn of each control wheel. Actuation of the control wheel switch energizes the overhead speaker relay, muting the output of the speaker. The audio integrating amplifier provides the necessary audio amplification for flight crew communications and is installed in the inboard radio rack on shelf 1. The amplifier contains an input transformer, input gain control, transistorized audio amplifier, and an output transformer. The amplifier input and output are connected to the audio control panels and the nose wheel well jack outlet. A screwdriver access hole is provided through the amplifier chassis to adjust the input gain control. Electrical power is applied by closing

the flight engineer's circuit breaker on the left emergency bus. Electrical connections are made through a receptacle mounted on the rear of the chassis.

2. Operation

A. For interphone operation, the interphone microphone selector switch is pressed, the audio selector switch is placed in the up position, and a microphone control switch is pressed muting the flight compartment speakers. Interphone audio is routed through the microphone selector switch to the flight interphone amplifier. The amplifier audio is routed to the interphone selector switch through the volume control to the isolation amplifier. Output audio is connected to the headset or to the applicable overhead flight compartment speaker amplifier.

B. For radio operation, applicable microphone selector switch is pressed and the applicable audio selector switch is placed in the up position. Employing the hand microphone and pressing the push-to-talk switch applies the microphone output to the control panel. Microphone outputs to transmitter control are routed through the microphone selector switch to the transmitter. Transmitter control relays are energized and the selected transmitter operates.

C. To monitor the audio inputs to the audio control panel, place the volume control to the midposition and the applicable audio selector switch to the up position. The audio outputs of the communication receivers, navigation receivers, and interphone amplifier are applied to the audio control panel. Each audio output is routed through an isolation resistor, volume control, and the isolation amplifier to the respective station headset or speaker.

D. For emergency operation, the emergency switch is placed to the emergency position. The control panel isolation amplifier is bypassed. Audio monitoring is selected one at a time by placing the applicable audio selector in the up position. The selected audio is connected directly to the headset or speaker through the emergency switch.

3. To Operate System

A. To Operate Interphone

(1) Energize electrical buses.

(2) Place controls to position indicated.

Control	Position
Audio control panel interphone microphone select switch	Pressed
Volume control	Midposition
Interphone audio switch	Up
Microphone push-to-talk switch	Pressed

(3) Speak into hand microphone and adjust volume control to a comfortable level.

D. To Operate Transmitters

(1) Energize electrical buses.

(2) Place controls to position indicated

Control	Position
Audio control panel desired HF or VHF switch	Up
Volume control	Midposition
Audio control panel applicable microphone select switch	Pressed
Microphone push-to-talk switch	Pressed

(3) Speak into hand microphone and adjust volume control to a comfortable level.

AUDIO INTEGRATING - DESCRIPTION AND OPERATION

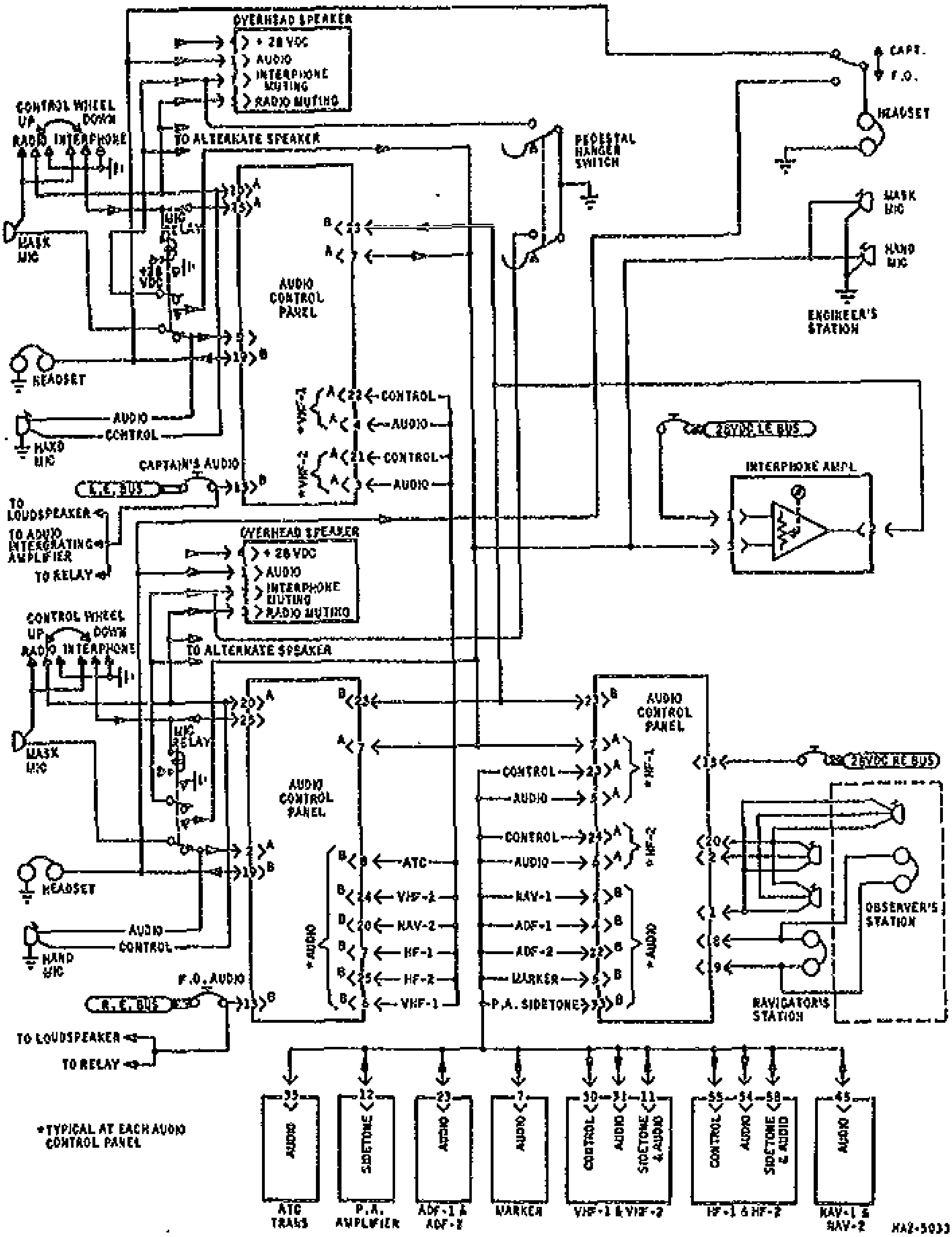
1. General

A. The audio integrating system provides a means of selecting and monitoring the audio outputs of the communication receivers, navigation receivers, the audio integrating amplifier and the passenger address system. In addition the audio integrating system provides a means of directing microphone outputs to the communication transmitters, and the audio integrating amplifier. (See Figure 1.) The audio integrating system consists of audio control panels, headsets and microphones, jack outlets, control switches, an audio amplifier, microphone relays and flight compartment loudspeakers.

B. The audio control panels control the audio integrating system. Control panels are provided at the captain's, first officer's, and the navigator's station. Each control panel contains audio selector switches, an emergency switch, microphone selector switches, isolation resistors, an isolation amplifier, a volume control, a filter switch and audio-filter. A switch at the flight engineer's panel permits monitoring the audio selected at either the captain's or the first officer's station. This switch does not permit independent selection of system audio inputs as provided at captain's or first officer's audio control panels.

C. The audio selector switches are placed in the up position to select HF and VHF communication receiver audio and sidetone, VHF navigation receiver audio, marker beacon receiver audio, automatic direction finder receiver audio, flight compartment interphone audio and passenger address sidetone. The selected audio inputs are connected to the normal audio circuits which routes the selected audio through the isolation resistor, audio selector switch, and volume control to the isolation amplifier input. In addition, the audio selector switches are an integral part of the emergency audio circuit. In conjunction with the emergency audio circuits, the audio selector switches are series connected from left to right when the switches are in the down position. When an audio switch is placed in the up position, all other audio selector switches are isolated from the emergency circuit and the selected audio is routed through the audio switch directly to the emergency switch.

D. The emergency switch provides a means of selecting normal or emergency audio circuit monitoring. When the switch is in the down position, normal audio monitoring is enabled. However when the switch is in the emergency up, position only one selected circuit may be monitored; all other circuits will be disabled. Audio from the selected emergency circuit bypasses the isolation circuits and is supplied directly to the emergency switch for distribution to the system.



Audio Integrating -- Simplified Schematic
Figure 1

E. The microphone selector switch provides a means of selecting any one of five microphone operating configurations. The selector switch is a five section pushbutton unit that locks each pushbutton as it is pressed and releases a previously activated pushbutton. Each switch enables microphone audio and control to be supplied to the selected system. Four transmitter control functions, VHF-1, HF-1, VHF-2, and HF-2, enable routing of flight crew microphone audio and control to the selected VHF or HF system. The INT position enables routing of microphone audio and control to the audio integrating amplifier.

F. An isolation resistor is placed in series with each audio input to the audio control panel to prevent interference between flight crew stations. The resultant signal loss caused by the isolation resistor is regained by the isolation amplifier. The isolation amplifier amplifies all audio inputs to the control panel when normal operation is selected.

G. Jacks for headsets and hand-held microphones are located at the captain's, first officer's, flight engineer's and navigator's stations. A headset jack is located at the observer's station. All flight crew stations are equipped with jacks for mask microphones. Push-to-talk switches on the captain's and first officer's control wheel provide control of their respective mask microphones for radio or interphone communications. A selector switch on the flight engineer's panel permits selection of either captain's or first officer's audio for monitoring.

H. The interphone amplifier is installed in the radio rack on shelf 1, and provides the necessary audio amplification for flight and maintenance communications. The amplifier contains an input transformer, input gain control, transistorized audio amplifier, and an output transformer. A screwdriver access hole is provided through the amplifier chassis to adjust the input gain control. The amplifier is connected directly to the jack outlets and connected to the handsets by the passenger address/interphone control relays. Electrical connections are made through a receptacle mounted on the amplifier chassis. Electrical power is supplied through the captain's audio circuit breaker located on the left dc emergency bus.

I. The microphone relays provide the captain's and the first officer's mask microphone audio output control and loudspeaker muting during interphone communications. The captain's microphone relay is installed in the left console and the first officer's microphone relay is installed in the right console. The microphone relay is energized by the control wheel switch in the interphone position or by the hand microphone push-to-talk switch when the interphone microphone selector switch is pressed.

J. Loudspeakers are installed at the captain's and first officer's stations. Each loudspeaker contains a transistorized audio amplifier, volume control, muting relay, and a speaker. The volume control is external and adjusts the loudspeaker output level. The muting relay is energized by the associated station push-to-talk switch and mutes the speaker to prevent feedback to the microphone. The muting relay is also energized by a

speaker muting circuit which is activated when the flight compartment service interphone handset is lifted from the hanger switch. All of the components contained in the loudspeaker are mounted on the front cover panel and a perforated back cover is provided for component cooling and protection. Electrical connections are made through a receptacle mounted on the back cover.

2. Operation

A. For interphone operation, the interphone microphone selector switch is pressed, the audio selector switch is placed in the up position, and a microphone control switch is pressed, muting the flight compartment speakers. Interphone audio is routed through the microphone selector switch to the flight interphone amplifier. The amplified audio is routed to the interphone audio selector switch through the volume control to the isolation amplifier. Output audio is connected to the headset or to the applicable overhead flight compartment speaker amplifier.

B. For radio operation, applicable microphone selector switch is pressed and the applicable audio selector switch is placed in the up position. Employing the hand microphone and pressing the push-to-talk switch applies the microphone output to the control panel. Microphone outputs to transmitter control are routed through the microphone selector switch to the transmitter. Transmitter control relays are energized and the selected transmitter operates.

C. To monitor the audio inputs to the audio control panel, place the volume control to the midposition and the applicable audio selector switch to the up position. The audio outputs of the communication receivers, navigation receivers, and interphone amplifier are applied to the audio control panel. Each audio output is routed through an isolation resistor, volume control, and the isolation amplifier to the respective station headset or speaker.

D. For emergency operation, the emergency switch is placed to the emergency position. The control panel isolation amplifier is bypassed. Audio monitoring is selected one function at a time by placing the applicable audio selector in the up position. The selected audio is connected directly to the headset or speaker through the emergency switch.

3. To Operate System

A. To Operate Interphone

(1) Energize electrical buses.

(2) Place controls to position indicated.

Control	Position
Audio control panel microphone select switch	Interphone
Volume control	Midposition
Interphone audio switch	On
Microphone push-to-talk switch	Pressed

(3) Speak into hand microphone and adjust volume control to a comfortable level.

B. To Operate Transceivers

(1) Energize electrical buses.

(2) Place controls to position indicated.

Control	Position
Audio control panel microphone select switch	Desired transceiver
Volume control	Midposition
Audio switch	Desired transceiver on
Microphone push-to-talk switch	Pressed

(3) Speak into hand microphone and adjust volume control to a comfortable level.

AUDIO INTEGRATING - DESCRIPTION AND OPERATION

1. General

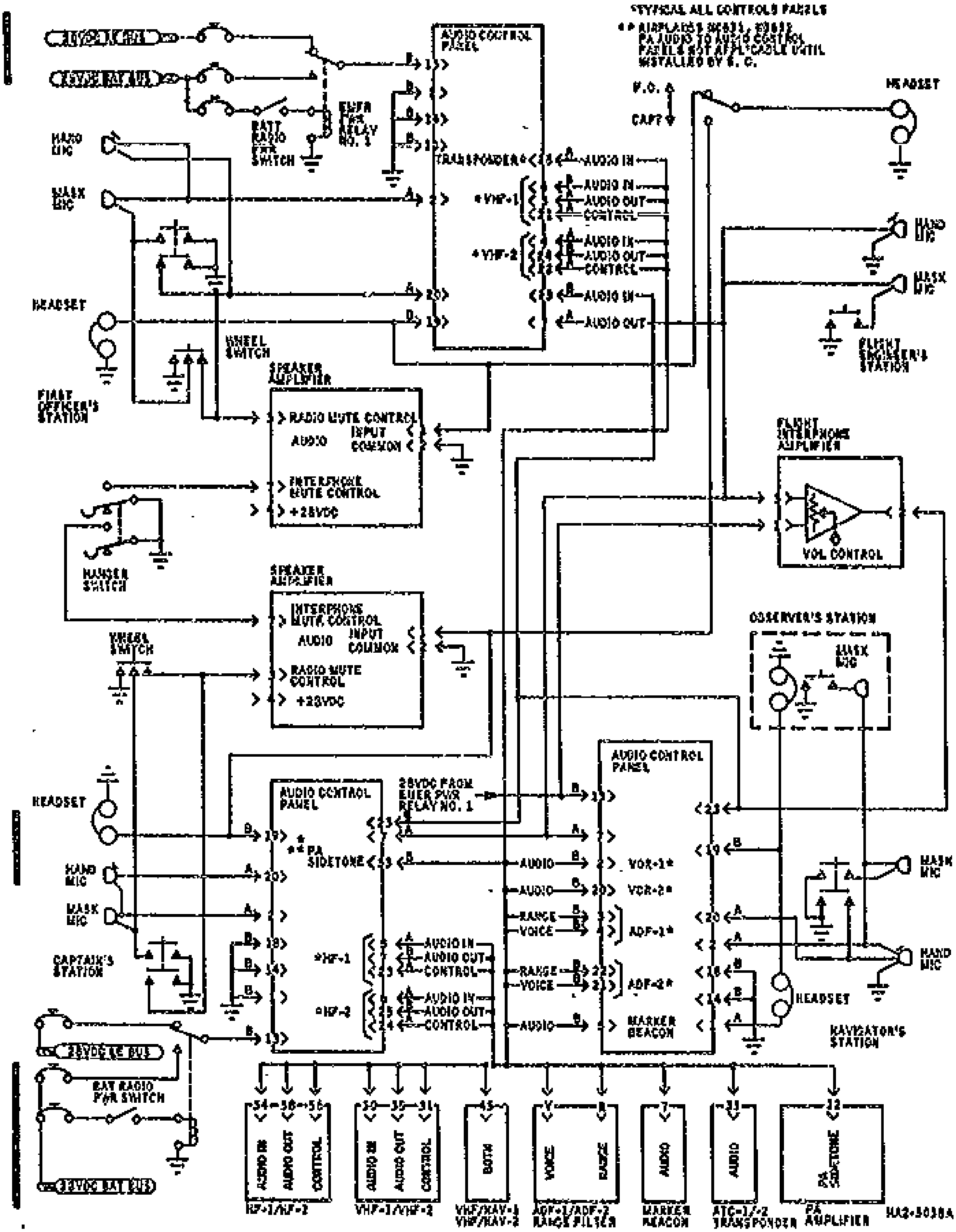
A. The audio integrating system provides a means of selecting and monitoring the audio outputs of the communication receivers, navigation receivers, and the audio integrating amplifier. In addition, the audio integrating system provides a means of directing microphone outputs to the communication transmitters and the audio integrating amplifier. (See Figure 1.) The audio integrating system consists of audio control panels, headsets, and microphones, jack outlets, control switches, an audio amplifier, and flight compartment loudspeakers.

B. The audio control panels control the audio integrating system. Control panels are provided at the captain's, first officer's, and the navigator's station. Each control panel contains audio selector switches, an emergency switch, microphone selector switches, isolation resistors, an isolation amplifier, and a volume control. A switch at the flight engineer's station permits monitoring the audio selected at either the captain's or the first officer's station. This switch does not permit independent selection of system audio inputs as provided at captain's or first officer's audio control panels.

C. The audio selector switches are placed in the up position to select HF and VHF communication receiver audio and sidetone, VHF navigation receiver audio, marker beacon receiver audio, automatic direction finder receiver audio, transponder audio and flight compartment interphone audio. The selected audio inputs are connected to the normal audio circuits which routes the selected audio through the isolation resistor, audio selector switch, and volume control to the isolation amplifier input. In addition, the audio selector switches are an integral part of the emergency audio circuit. In conjunction with the emergency audio circuits, the audio selector switches are series connected from left to right when the switches are in the down position. When an audio switch is placed in the up position, all other audio selector switches are isolated from the emergency circuit and the selected audio is routed through the audio switch directly to the emergency switch.

D. The emergency switch provides a means of selecting normal or emergency audio circuit monitoring. When the switch is in the down position, normal audio monitoring is enabled. However, when the switch is in the emergency up position only one selected circuit may be monitored; all other circuits will be disabled. Audio from the selected emergency circuit bypasses the isolation circuits and is supplied directly to the emergency switch for distribution to the system.

E. The microphone selector switch provides a means of selecting any one of six microphone operating configurations. The selector switch is a six section pushbutton unit that locks each pushbutton as it is pressed and releases a previously activated pushbutton. Each switch enables



Audio Integrating -- Simplified Schematic
Figure 1

microphone audio and control to be supplied to the selected system. Transmitter control functions, VHF-1, HF-1, VHF-2, HF-2, and PA enable routing of flight crew microphone audio and control to the selected VHF, HF or PA system. The INT position enables routing of microphone audio and control to the audio integrating amplifier. On airplanes N8631 and N8632 audio control panels are not operational with the passenger address system until microphone and audio control wiring is connected.

F. An isolation resistor is placed in series with each audio input to the audio control panel to prevent interference between flight crew stations. The resultant signal loss caused by the isolation resistor is regained by the isolation amplifier. The isolation amplifier amplifies all audio inputs to the control panel when normal operation is selected.

G. Jacks for headsets and hand-held microphones are located at the captain's, first officer's, flight engineer's and navigator's stations. A headset jack is located at the observer's station. All flight crew stations are equipped with jacks for mask microphones. Push-to-talk switches on the captain's and first officer's control wheel provide control of their respective microphones. A selector switch on the flight engineer's panel permits selection of either captain's or first officer's audio for monitoring.

H. The audio integrating amplifier provides the necessary audio amplification for flight crew interphone communications. The amplifier contains an input transformer, input gain control, transistorized audio amplifier, and an output transformer. A screwdriver access hole is provided through the amplifier to adjust the input gain control. The amplifier is installed in the left hand console and electrical power is supplied through the captain's audio circuit breaker located on the left dc emergency bus.

I. The flight compartment loudspeakers provide the captain and first officer a means of monitoring the audio integrating system without the use of the headset. Loudspeakers are installed in the overhead at the captain's and first officer's station. Each loudspeaker contains a transistorized audio amplifier, muting relay, volume control, and a speaker. The audio amplifier amplifies the audio outputs from the associated station audio control panel. The muting relay mutes the speaker to prevent feedback to the microphone. The volume control is located in the center of the speaker grill and is routed to adjust the speaker volume.

. Operation

A. For interphone operation, the interphone microphone selector switch is pressed, the audio selector switch is placed in the up position, and a microphone control switch is pressed muting the flight compartment speakers. Interphone audio is routed through the microphone selector switch to the flight interphone amplifier. The amplified audio is routed to the interphone selector switch through the volume control to the isolation amplifier. Output audio is connected to the headset or to the applicable overhead flight compartment speaker amplifier.

B. For radio operation, applicable audio selector switch is placed in the up position. Employ.ng the hand microphone and pressing the push-to-talk switch applies the microphone output to the control panel. Microphone outputs to transmitter control are routed through the microphone selector switch to the transmitter. Transmitter control relays are energized and the selected transmitter operates.

C. To monitor the audio inputs to the audio control panel, place the volume control to the midposition and the applicable audio selector switch to the up position. The audio outputs of the communication receivers, navigation receivers, and interphone amplifier are applied to the audio control panel. Each audio output is routed through an isolation resistor, volume control, and the isolation amplifier to the respective station headset or speaker.

D. For emergency operation, the emergency switch is placed to the emergency position. The control panel isolation amplifier is bypassed. Audio monitoring is selected one at a time by placing the applicable audio selector in the up position. The selected audio is connected directly to the headset or speaker through the emergency switch.

3. To Operate System

A. To Operate Interphone

(1) Energize electrical buses.

(2) Place controls to position indicated.

Control	Position
Audio control panel microphone select switch	Interphone
Volume control	Midposition
Interphone audio switch	On
Microphone push-to-talk switch	Pressed

(3) Speak into hand microphone and adjust volume control to a comfortable level.

B. To Operate Transceivers

(1) Energize electrical buses.

(2) Place controls to position indicated.

Control	Position
Audio control panel microphone select switch	Desired transceiver
Volume control	Midposition
Audio switch	Desired transceiver on
Microphone push-to-talk switch	Pressed

(3) Speak into hand microphone and adjust volume control to a comfortable level.

AUDIO INTEGRATING - DESCRIPTION AND OPERATION

1. General

A. The audio integrating system provides a means of selecting and monitoring the audio outputs of the communication transceivers, navigation receivers, audio integrating amplifier, and passenger address amplifier and the selection and control of microphone outputs to the communication transceivers and to the audio integrating amplifier. In addition, the audio integrating system provides ground to flight crew communications.

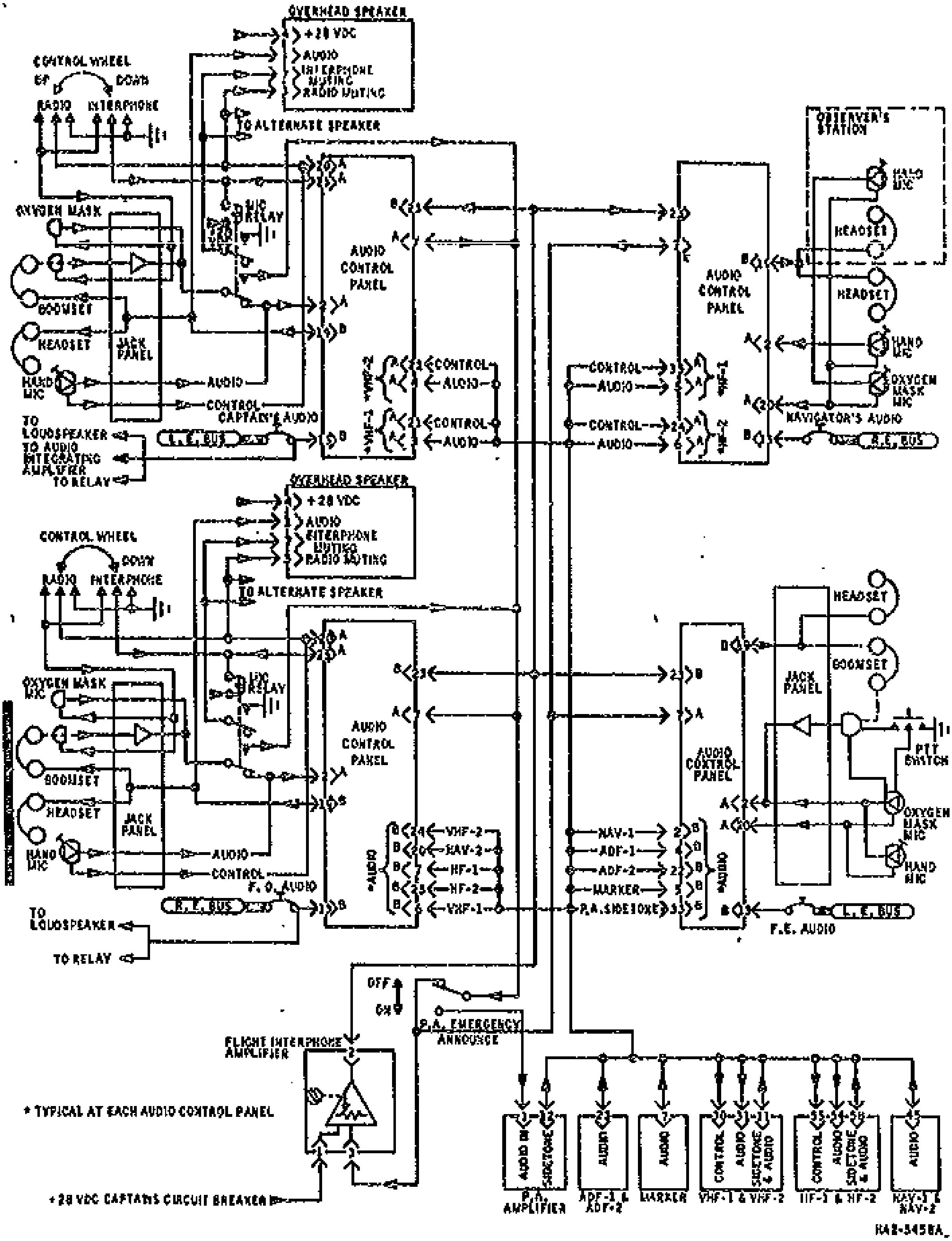
B. The audio integrating system consists of audio control panels, conventional and boom microphone headsets, microphones, jack outlets, microphone relays, control switches, audio amplifier, and loudspeakers. (See Figure 1.)

C. The audio control panels control the audio integrating system. A control panel is provided at each flight crew station except the observer's station. Each control panel contains audio control knobs, aural navigation switches, microphone selector switches, isolation resistors, isolation amplifier, filter switch and an audio filter, and the microphone selector switch internal lamps.

D. The audio control knobs select and adjust the audio outputs of the communication transceivers, navigation receivers, marker receiver, audio integrating amplifier, and passenger address amplifier. The aural navigation switches select the audio outputs of the automatic direction finder receivers. The microphone selector switches select and control the microphone audio outputs to the communication transceivers and to the audio integrating amplifier. An isolation resistor is in series with each audio input to the audio control panel to prevent interference between flight crew stations. The resultant signal loss by the isolation resistors is regained by the isolation amplifier. The isolation amplifier amplifies all audio inputs to the audio control panel. The filter switch selects or bypasses the audio filter and the audio filter reduces the noise level of the audio outputs from the audio control panel.

E. The conventional headsets provide audio monitoring and a headset is installed at each flight crew station and at the observer's station. The boom microphone headsets provide speech reproduction and audio monitoring and a boomset is installed at the captain's, first officer's and flight engineer's station. Each headset and boomset is provided with a jack for installation.

F. The boom microphones, oxygen mask microphones, and the hand microphones, are provided for voice reproduction. All of the microphones are dynamic microphones and require audio preamplification. An oxygen mask microphone is installed at each flight crew station. The mask microphones at the captain's and first officer's station are provided with a connector for installation. The mask microphones at the flight engineer's and navigator's station contain an integral audio preamplifier and push-to-talk switch and are provided with a jack for installation. A hand microphone is installed



Audio Integrating -- Simplified Schematic
Figure 1

at each flight crew station and at the observer's station. Each hand microphone contains an integral audio preamplifier and a push-to-talk switch and is provided with a jack for installation.

G. The microphone jack panels, oxygen mask microphone jack outlets, hand microphone jack outlets, conventional headset jack outlets, and the handset jack outlet are provided for the installation of the headsets, boomsets, and microphones. The microphone jack panels are installed at the captain's, first officer's and flight engineer's stations. Each microphone jack panel contains jack outlets for the hand microphone and conventional headset, receptacles for the oxygen mask microphone and the boomset, and an audio amplifier for the boomset microphone. An adapter is installed in the boomset receptacle to provide a jack outlet for the boomset. The oxygen mask microphone jack outlets are installed at the flight engineer's and navigator's stations. The hand microphone jack outlets are installed at the flight crew and observer's station. The conventional headset jack outlets are installed at the navigator's and observer's stations. The observer's jack outlets are connected in parallel to the navigator's jack outlets. The handset jack outlet is installed in the nosewheel well to provide ground to flight compartment communications. The handset jack outlet is connected to the audio integrating amplifier input and output.

H. The microphone relays provide the captain's and the first officer's boom and oxygen mask microphone audio output control and loudspeaker muting during interphone communications. The captain's microphone relay is installed in the left console and the first officer's microphone relay is installed in the right console. The microphone relay is energized by the control wheel switch in the interphone position or by the hand microphone push-to-talk switch when the interphone microphone selector switch is pressed.

I. The microphone control switches and the passenger address emergency announce switch are provided for the audio integrating system. A microphone control switch, which provides the captain's and the first officer's boom and oxygen mask microphone control, is installed in the outboard horn of each control wheel. The control wheel switch is placed to the up position for radio communications and in the down position for interphone communications. The passenger address emergency announce switch provides a means of transferring the captain's and first officer's microphone audio outputs from the audio integrating system to the passenger address system. The passenger address emergency announce switch is installed on the aft control pedestal. The flight engineer's boomset and oxygen mask microphones are controlled with the push-to-talk switch located at the flight engineer's control panel.

J. The audio integrating amplifier provides the necessary audio amplification for flight crew interphone communications. The amplifier contains an input transformer, input gain control, transistorized audio amplifier, and an output transformer. The amplifier input is connected to the audio control panels, microphone relays, nosewheel well jack outlet, and the passenger address emergency announce switch. The amplifier output is connected to the audio control panels and to the nosewheel well jack outlet. A

screwdriver access hole is provided through the amplifier to adjust the input gain control. The amplifier is installed in the inboard radio rack on shelf 1 and electrical power is supplied through the captain's audio circuit breaker located on the left dc emergency bus.

K. The loudspeakers provide the captain and the first officer a means of monitoring the audio integrating system without the use of the headset or boomset. A loudspeaker is installed overhead at the captain's station and one is installed overhead at the first officer's station. Each loudspeaker contains a transistorized audio amplifier, muting relay, volume control, and a speaker. The audio amplifier amplifier the audio outputs from the associated station audio control panel. The muting relay mutes the speaker to prevent feedback to the microphone. The volume control is external and adjusts the speaker output volume. Electrical power is supplied by the associated station audio circuit breaker on the 28 vdc emergency bus.

2. Operation

A. For interphone operation at the captain's and first officer's stations, the interphone audio control knob is placed in a forward position and the interphone microphone selector switch is pressed. All microphone selector switch internal lamps come on, indicating power is applied to the audio integrating amplifier. Employing the boomset or oxygen mask microphone and placing the control wheel switch to the radio or interphone position energizes the microphone relay. The associated station loudspeaker is muted and microphone audio is routed through the microphone relay to the audio integrating amplifier and is then amplified. Employing the hand microphone and depressing the push-to-talk switch energizes the microphone relay. The associated station loudspeaker is muted and microphone audio is applied to the audio control panel, and routed through the microphone selector switch to the audio integrating amplifier. The amplified audio is applied to the audio control panel and routed through the isolation resistor, audio control knob potentiometer, isolation amplifier, and filter switch to the headset, boomset, and loudspeaker. The interphone microphone selector switch need not be depressed for boomset and oxygen mask microphone interphone communications if the control wheel switch is placed in the interphone position.

B. For interphone operation at the navigator's and flight engineer's station, the interphone audio control knob is placed in a forward position and the interphone microphone selector switch is depressed. All microphone selector switch internal lamps come on, indicating power is applied to the audio integrating amplifier. Employing the hand microphone or the oxygen mask microphone and depressing the integral push-to-talk switch applies microphone audio to the audio control panel. The microphone audio is routed through the microphone selector switch to the audio integrating amplifier and is then amplified. The amplified audio is applied to the audio control panel and routed through the isolation resistor, and audio control knob potentiometer, isolation amplifier, and filter switch to the headsets.

C. For passenger address announcements from the captain's and first officer's station, the passenger address emergency announce switch is placed to the on position. The microphone outputs normally routed to the audio integrating amplifier from the captain's station and the first officer's station are transferred to the passenger address system by the passenger address emergency announce switch.

D. To monitor the audio inputs to the audio control panels, the audio control knobs are placed in a forward position and the audio monitor switches in on. The audio outputs of the communication transceivers, navigation receivers, audio integrating amplifier, and passenger address amplifier are applied to the audio control panel. Each audio input to the audio control panel is routed through an isolation resistor, an audio control knob potentiometer or switch, the isolation amplifier, and the filter switch to the respective station headset, boomset, and loudspeaker.

E. For operating a communication transceiver at the captain's station and the first officer's station, the transceiver microphone selector switch is pressed and the transceiver audio control knob is placed in a forward position. Employing the boomset or oxygen mask microphone and placing the control wheel switches in the radio position mutes the loudspeakers and applies the microphone outputs to the audio control panel. Employing the hand microphone and depressing the push-to-talk switch mutes the loudspeakers and applies the microphone outputs to the audio control panel. Employing the hand microphone and depressing the push-to-talk switch mutes the loudspeakers and applies the microphone outputs to the audio control panel. The microphone outputs and transceiver mode control are routed through the microphone selector switch to the transceiver. The transceiver control relays are energized and the transceiver transfers to the transmitting mode of operation. The microphone outputs modulate the transmitter frequency and the output is sampled for sidetone. Sidetone is applied to the audio control panels. Sidetone is routed through an isolation resistor, audio control knob potentiometer, the isolation amplifier, and the filter switch to the headset, boomset, and loudspeaker.

F. For operating a transceiver at the flight engineer's and navigator's stations, the transceiver microphone selector switch is pressed and the audio control knob is placed in a forward position. Employing the hand microphone or oxygen mask microphone and depressing the push-to-talk switch applies microphone outputs and transceiver mode control to the audio control panel. Microphone outputs and transceiver mode control are routed through the microphone selector switch to the transceiver. The transceiver control relays are energized and the transceiver transfers to a transmitter mode of operation. The microphone outputs modulate the transmitter frequency and the output is sampled for sidetone. Sidetone is applied to the audio control panels. Sidetone is routed through an isolation resistor, audio control knob potentiometer, the isolation amplifier, and the filter switch to the headsets.

3. To Operate System

A. To Operate Interphone at Captain's Station and First Officer's Station

(1) Energize electrical buses.

(2) Place controls to position indicated.

Control	Position
Passenger address emergency announce switch	Off
Interphone microphone selector switch	Depressed
Interphone audio control knob	Forward
Boomset or oxygen mask microphone	Employed
Control wheel switches	Interphone
or	
Hand microphone	Employed
Push-to-talk switch	Depressed

(3) Speak into microphone with normal tone and adjust interphone audio control knob to monitor audio at comfortable level.

B. To Operate Interphone at Flight Engineer's Station and Navigator's Station

(1) Energize electrical buses.

(2) Depress interphone microphone selector switch.

(3) Place audio control knob in a forward position.

(4) Employ hand microphone, oxygen mask microphone or boomset microphone at navigator's station and depress push-to-talk switch.

(5) Speak into microphone with normal tone and adjust interphone audio control knob to monitor audio at comfortable level.

C. To Operate Passenger Address from Captain's Station and First Officer's Station

(1) Energize electrical buses.

(2) Place control in position indicated.

Control	Position
Passenger address emergency announce switch	On
Interphone microphone selector switch	Depressed
Passenger address audio control knob	Forward
Boomset or oxygen mask microphone	Employed
Control wheel switches	Interphone
or	
Hand microphone	Employed
Push-to-talk switch	Depressed

(3) Speak into microphone with normal tone and adjust passenger address audio control knob to monitor audio at comfortable level.

D. To Monitor Audio

(1) Adjust audio control knobs to monitor audio at comfortable level.

(2) Place audio monitor switches in on.

(3) Adjust loudspeaker volume controls to monitor audio at comfortable level.

E. To Operate Transceivers at Captain's Station and First Officer's Station

(1) Energize electrical buses.

(2) Place controls in position indicated.

Control	Position
Transceiver microphone selector switch	Depressed
Transceiver audio control knob	Forward
Boomset or oxygen mask microphone	Employed

Control	Position
Control wheel switch	Radio
or	
Hand microphone	Employed
Push-to-talk switch	Depressed

(3) Speak into microphone with normal tone and adjust transceiver audio control knob to monitor audio at comfortable level.

F. To Operate Transceiver at Flight Engineer's Station and Navigator's Station

(1) Energize electrical buses.

(2) Depress transceiver microphone selector switch.

(3) Place transceiver audio control knob in forward.

(4) Employ hand microphone oxygen mask microphone or boomset microphone at navigator's station and depress push-to-talk switch.

(5) Speak into microphone with normal tone and adjust transceiver audio control knob to monitor sidetone at comfortable level.

AUDIO INTEGRATING - DESCRIPTION AND OPERATION

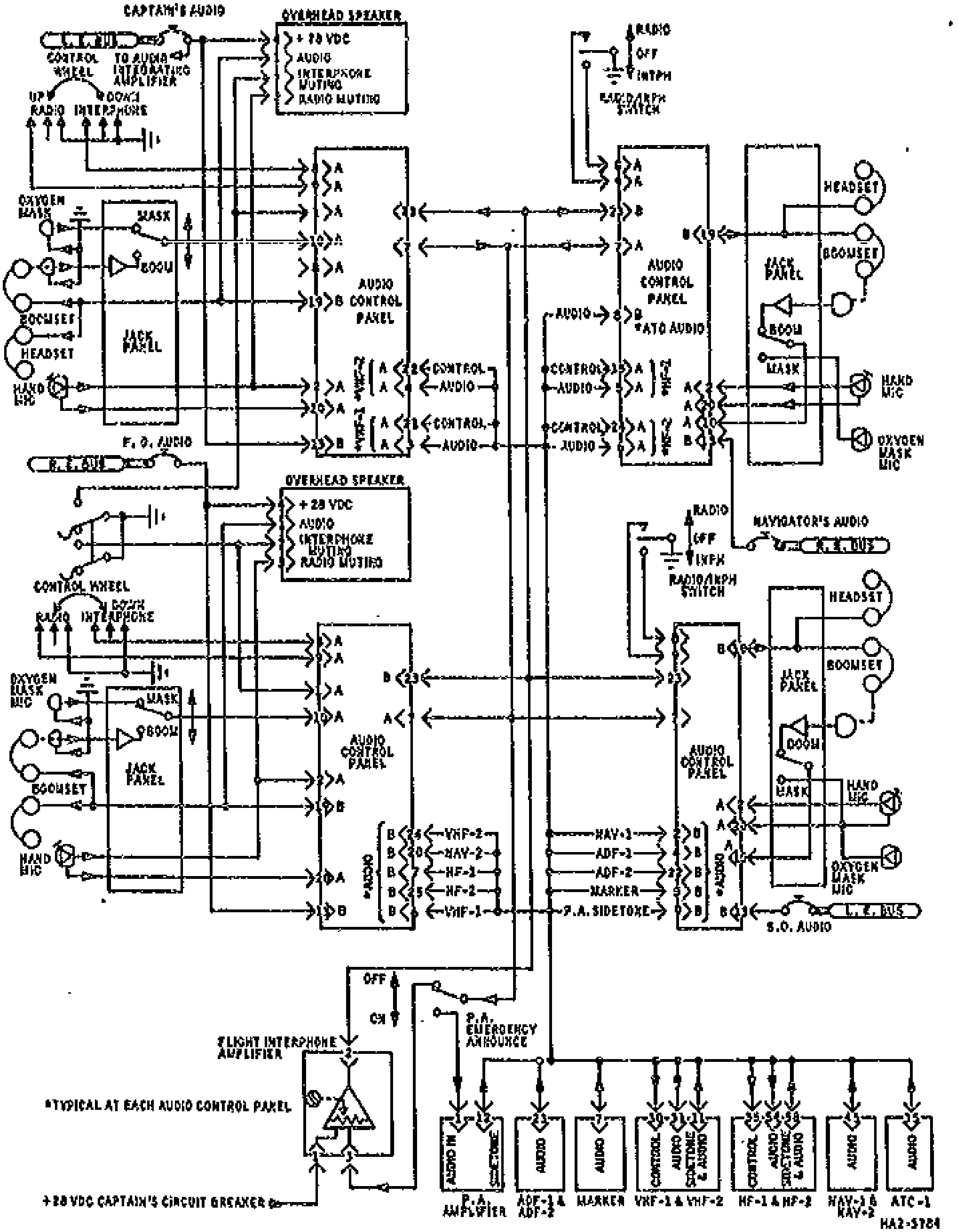
1. General

A. The audio integrating system provides a means of selecting and monitoring the audio outputs of the communication receivers, navigation receivers, the audio integrating amplifier and the passenger address system. In addition the audio integrating system provides a means of directing microphone outputs to the communication transmitters, and the audio integrating amplifier. (See Figure 1.) The audio integrating system consists of audio control panels, headsets and microphones, jack panels, control switches, an audio amplifier, microphone relays and flight compartment loudspeakers.

B. The audio control panels control the audio integrating system. Control panels are provided at the captain's, first officer's, system operator's, and the navigator's station. Each control panel contains audio selector switches, an emergency switch, microphone selector switches, isolation resistors, an isolation amplifier, microphone relays a volume control, a filter switch and audio-filter. A passenger address emergency announce switch, located on the aft pedestal, when placed in the on position will permit emergency passenger address announcements to be made through the audio control panels and from the aft pedestal and aft of captain's seat jack outlets.

C. The audio selector switches are placed in the up position to select HF and VHF communication receiver audio and sidetone, VHF navigation receiver audio, marker beacon receiver audio, automatic direction finder receiver audio, flight compartment interphone audio and passenger address sidetone. The selected audio inputs are connected to the normal audio circuits which routes the selected audio through the isolation resistor, audio selector switch, and volume control to the isolation amplifier input. In addition, the audio selector switches are an integral part of the emergency audio circuit. In conjunction with the emergency audio circuits, the audio selector switches are series connected from left to right when the switches are in the down position. When an audio switch is placed in the up position, all other audio selector switches are isolated from the emergency circuit and the selected audio is routed through the audio switch directly to the emergency switch.

D. The emergency switch provides a means of selecting normal or emergency audio circuit monitoring. When the switch is in the down position, normal audio monitoring is enabled. However when the switch is in the emergency up, position only one selected circuit may be monitored; all other circuits will be disabled. Audio from the selected emergency circuit bypasses the isolation circuits and is supplied directly to the emergency switch for distribution to the system.



Audio Integrating -- Simplified Schematic
Figure 1

E. The microphone selector switch provides a means of selecting any one of five microphone operating configurations. The selector switch is a five section pushbutton unit that locks each pushbutton as it is pressed and releases a previously activated pushbutton. Each switch enables microphone audio and control to be supplied to the selected system. Four transmitter control functions, VHF-1, HF-1, VHF-2, and HF-2, enable routing of flight crew microphone audio and control to the selected VHF or HF system. The INT position enables routing of microphone audio and control to the audio integrating amplifier.

F. An isolation resistor is placed in series with each audio input to the audio control panel to prevent interference between flight crew stations. The resultant signal loss caused by the isolation resistor is regained by the isolation amplifier. The isolation amplifier amplifies all audio inputs to the control panel when normal operation is selected.

G. Relays within the audio control panel, are actuated when the control wheel microphone switches or the radio/interphone transfer switches are placed in the interphone or radio position. Interphone position of the switch operates the interphone relay, connecting the mask or boom microphone audio to the interphone amplifier. The radio relay is operated when the switch is in the radio position, connecting the mask or boom microphone audio to the applicable radio transmitter.

H. The interphone amplifier is installed in the radio rack on shelf 1, and provides the necessary audio amplification for flight and maintenance communications. The amplifier contains an input transformer, input gain control, transistorized audio amplifier, and an output transformer. A screwdriver access hole is provided through the amplifier chassis to adjust the imput gain control. The amplifier is connected directly to the jack outlets and connected to the handsets by the passenger address/ interphone control relays. Electrical connections are made through a receptacle mounted on the amplifier chassis. Electrical power is supplied through the captain's audio circuit breaker located on the left dc emergency bus.

I. Jack panels are located at the captain's, first offier's, system operator's, and navigator's station. Each panel contains a preamplifier, microphone select switch, headset, and microphone jack outlets. Boom microphone audio is routed through the connector to the preamplifier. The microphone switch is used to select the boom or mask microphone. Jack outlets are provided for the headset, mask microphone, and hand microphone.

J. Loudspeakers are installed at the captain's and first officer's stations. Each loudspeaker contains a transistorized audio amplifier, volume control, muting relay, and a speaker. The volume control is external and adjusts the loudspeaker output level. The muting relay is energized by the associated station push-to-talk switch and mutes the speaker to prevent feedback to the microphone. The muting relay is also energized by a

speaker muting circuit which is activated when the flight compartment service interphone handset is lifted from the hanger switch. All of the components contained in the loudspeaker are mounted on the front cover panel and a perforated back cover is provided for component cooling and protection. Electrical connections are made through a receptacle mounted on the back cover.

2. Operation

A. For interphone operation, the interphone microphone selector switch is pressed, the audio selector switch is placed in the up position, and a microphone control switch is pressed, muting the flight compartment speakers. Interphone audio is routed through the microphone selector switch to the flight interphone amplifier. The amplified audio is routed to the interphone audio selector switch through the volume control to the isolation amplifier. Output audio is connected to the headset or to the applicable overhead flight compartment speaker amplifier.

B. For radio operation, applicable microphone selector switch is pressed and the applicable audio selector switch is placed in the up position. Employing the hand microphone and pressing the push-to-talk switch applies the microphone output to the control panel. Microphone outputs to transmitter control are routed through the microphone selector switch to the transmitter. Transmitter control relays are energized and the selected transmitter operates.

C. To monitor the audio inputs to the audio control panel, place the volume control to the midposition and the applicable audio selector switch to the up position. The audio outputs of the communication receivers, navigation receivers, and interphone amplifier are applied to the audio control panel. Each audio output is routed through an isolation resistor, volume control, and the isolation amplifier to the respective station headset or speaker.

D. For emergency operation, the emergency switch is placed to the emergency position. The control panel isolation amplifier is bypassed. Audio monitoring is selected one function at a time by placing the applicable audio selector in the up position. The selected audio is connected directly to the headset or speaker through the emergency switch.

3. To Operate System

A. To Operate Interphone

(1) Energize electrical buses.

(2) Place controls to position indicated.

Control	Position
Audio control panel microphone select switch	Interphone
Volume control	Midposition
Interphone audio switch	On
Microphone push-to-talk switch	Pressed

(3) Speak into hand microphone and adjust volume control to a comfortable level.

B. To Operate Transceivers

(1) Energize electrical buses.

(2) Place controls to position indicated.

Control	Position
Audio control panel microphone select switch	Desired tranceiver
Volume control	Midposition
Audio switch	Desired transceiver on
Microphone push-to-talk switch	Pressed

(3) Speak into hand microphone and adjust volume control to a comfortable level.

AUDIO INTEGRATING - DESCRIPTION AND OPERATION

1. General

A. The audio integrating system provides a means of selecting and monitoring the audio outputs of the communication receivers, navigation receivers, and the audio integrating amplifier. In addition the audio integrating system provides a means of directing microphone outputs to the communication transmitters and the audio integrating amplifier. (See Figure 1.) The audio integrating system consists of audio control panels, headsets and microphones, jack outlets, control switches, an audio amplifier, and flight compartment loudspeakers.

B. The audio control panels control the audio integrating system. Control panels are provided at the captain's, first officer's, and the navigator's station. Each control panel contains audio selector switches, an emergency switch, microphone selector switches, isolation resistors, and isolation amplifier, a volume control, automatic direction finding switches, a marker beacon and VOR selector switches. A switch at the flight engineer's panel permits monitoring the audio selected at either the captain's or the first officer's station. This switch does not permit independent selection of system audio inputs as provided at captain's or first officer's audio control panels.

C. The audio selector switches are placed in the up position to select HF and VHF communication receiver audio and sidetone VHF navigation receiver audio, marker beacon receiver audio, automatic direction finder receiver audio, and flight compartment interphone audio. The selected audio inputs are connected to the normal audio circuits which routes the selected audio through the isolation resistor, audio selector switch, and volume control to the isolation amplifier input. In addition, the audio selector switches are an integral part of the emergency audio circuit. In conjunction with the emergency audio circuits, the audio selector switches are series connected from left to right when the switches are in the down position. When an audio switch is placed in the up position, all other audio selector switches are isolated from the emergency circuit and the selected audio is routed through the audio switch directly to the emergency switch.

D. The emergency switch provides a means of selecting normal or emergency audio circuit monitoring. When the switch is in the down position, normal audio monitoring is enabled. However, when the switch is in the emergency, up position only one selected circuit may be monitored; all other circuits will be disabled. Audio from the selected emergency circuit bypasses the isolation circuits and is supplied directly to the emergency switch for distribution to the system.

E. The microphone selector switch provides a means of selecting any one of five microphone operating configurations. The selector switch is a five section pushbutton unit that locks each pushbutton as it is pressed and releases a previously activated pushbutton. Each switch enables microphone audio and control to be supplied to the selected system. Four

transmitter control functions, VHF-1, HF-1, VHF-2, and HF-2, enable routing of flight crew microphone audio and control to the selected VHF or HF system. The INT position enables routing of microphone audio and control to the audio integrating amplifier.

F. An isolation resistor is placed in series with each audio input to the audio control panel to prevent interference between flight crew stations. The resultant signal loss caused by the isolation resistor is regained by the isolation amplifier. The isolation amplifier amplifies all audio inputs to the control panel when normal operation is selected.

G. Microphone jacks for headsets and hand-held microphones are located at the captain's, first officer's, flight engineer's and navigator's stations. A headset jack is located at the observer's station. All flight crew stations are equipped with jacks for mask microphones. Push-to-talk switches on the captain's and first officer's control wheel provide control of their respective microphones. A selector switch on the flight engineer's panel permits selection of either captain's or first officer's audio for monitoring.

H. The interphone audio amplifier is installed in the outboard radio rack on shelf 5 and provides the necessary audio amplification for flight personnel communications. The amplifier contains an input transformer, input gain control, transistorized audio amplifier, and an output transformer. A screwdriver access hole is provided through the amplifier chassis to adjust the input gain control. Electrical connections are made through a receptacle mounted on the amplifier chassis. The amplifier input and output are connected to the control relays by the audio signal wiring. Power is supplied by the 28-vdc left emergency bus or battery bus when the battery radio power switch is in the battery position.

I. Loudspeakers are installed at the captain's and first officer's stations. Each loudspeaker contains a transistorized audio amplifier, volume control, muting relay, and a speaker. The volume control is external and adjusts the loudspeaker output level. The muting relay is energized by the associated station push-to-talk switch and mutes the speaker to prevent feedback to the microphone. The muting relay is also energized by a speaker muting circuit which is activated when the flight compartment service interphone headset is lifted from the hanger switch. All of the components contained in the loudspeaker are mounted on the front cover panel and a perforated back cover is provided for component cooling and protection. Electrical connections are made through a receptacle mounted on the back cover.

J. A microphone control switch is installed on the outboard horn of each control wheel. Actuation of the control wheel switch energizes the overhead speaker relay, muting the output of the speaker. The audio integrating amplifier provides the necessary audio amplification for flight crew communications.

2. Operation

A. For interphone operation, the interphone microphone selector switch is pressed, the audio selector switch is placed in the up position, and a microphone control switch in pressed muting the flight compartment speakers. Interphone audio is routed through the microphone selector switch to the flight interphone amplifier. The amplifier audio is routed to the interphone selector switch through the volume control to the isolation amplifier. Output audio is connected to the headset or to the applicable overhead flight compartment speaker amplifier.

B. For radio operation, applicable microphone selector switch is pressed and the applicable audio selector switch is placed in the up position. Employing the hand microphone and pressing the push-to-talk switch applies the microphone output to the control panel. Microphone outputs to transmitter control are routed through the microphone selector switch to the transmitter. Transmitter control relays are energized and the selected transmitter operates.

C. To monitor the audio inputs to the audio control panel, place the volume control to the midposition and the applicable audio selector switch to the up position. The audio outputs of the communication receivers, navigation receivers, and interphone amplifier are applied to the audio control panel. Each audio output is routed through an isolation resistor, volume control, and the isolation amplifier to the respective station headset or speaker.

D. For emergency operation, the emergency switch is placed to the emergency position. The control panel isolation amplifier is bypassed. Audio monitoring is selected one at a time by placing the applicable audio selector in the up position. The selected audio is connected directly to the headset or speaker through the emergency switch.

3. To Operate System

A. To Operate Interphone

(1) Energize electrical buses.

(2) Place controls to position indicated.

Control	Position
Audio control panel interphone microphone select switch	Pressed
Volume control	Midposition
Interphone audio switch	Up
Microphone push-to-talk switch	Pressed

(3) Speak into hand microphone and adjust volume control to a comfortable level.

B. To Operate Transmitters

(1) Energize electrical buses.

(2) Place controls to position indicated.

Control	Position
Audio control panel desired HF or VHF switch	Up
Volume control	Midposition
Audio control panel applicable microphone select switch	Pressed
Microphone push-to-talk switch	Pressed

(3) Speak into hand microphone and adjust volume control to a comfortable level.

AUDIO INTEGRATING - DESCRIPTION AND OPERATION

1. General

A. The audio integrating system provides a means of selecting and monitoring the audio outputs of the communication transceivers, navigation receivers, audio integrating amplifier, and the selection and control of microphone outputs to the communication transceivers and to the audio integrating amplifier. In addition, the audio integrating system provides ground to flight crew communications.

B. The audio integrating system consists of audio control panels, conventional and boom microphone headsets, microphones, jack outlets, microphone relays, control switches, audio amplifier, and loudspeakers. (See Figure 1.)

C. The audio control panels control the audio integrating system. A control panel is provided at each flight crew station and each control panel contains audio control knobs, aural navigation switches, microphone selector switches, isolation resistors, isolation amplifier, filter switch and an audio filter, and the microphone selector switch internal lamps.

D. The audio control knobs select and adjust the audio outputs of the communication transceivers, navigation receivers, marker receiver, and audio integrating amplifier. The aural navigation switches select the audio outputs of the automatic direction finder receivers. The microphone selector switches select and control the microphone audio outputs to the communication transceivers and to the audio integrating amplifier. An isolation resistor is in series with each audio input to the audio control panel to prevent interference between flight crew stations. The resultant signal loss by the isolation resistors is regained by the isolation amplifier. The isolation amplifier amplifies all audio inputs to the audio control panel. The filter switch selects or bypasses the audio filter and the audio filter reduces the noise level of the audio outputs from the audio control panel.

E. The conventional headsets provide audio monitoring and a headset is installed at each flight crew station and at the observer's station. The boom microphone headsets provide speech reproduction and audio monitoring and a boomset is installed at the captain's station and one at the first officer's station. Each headset and boomset is provided with a jack for installation.

F. The boom microphones, oxygen mask microphones, and the hand microphones, are provided for voice reproduction. All of the microphones are dynamic microphones and require audio preamplification. An oxygen mask microphone is installed at each flight crew station. The mask microphones at the captain's and first officer's station are provided with a connector for installation. The mask microphones at the flight engineer's and navigator's station contain an integral audio preamplifier and push-to-talk switch and are provided with a jack for installation. A hand microphone is installed at each flight crew station and at the observer's station. Each hand

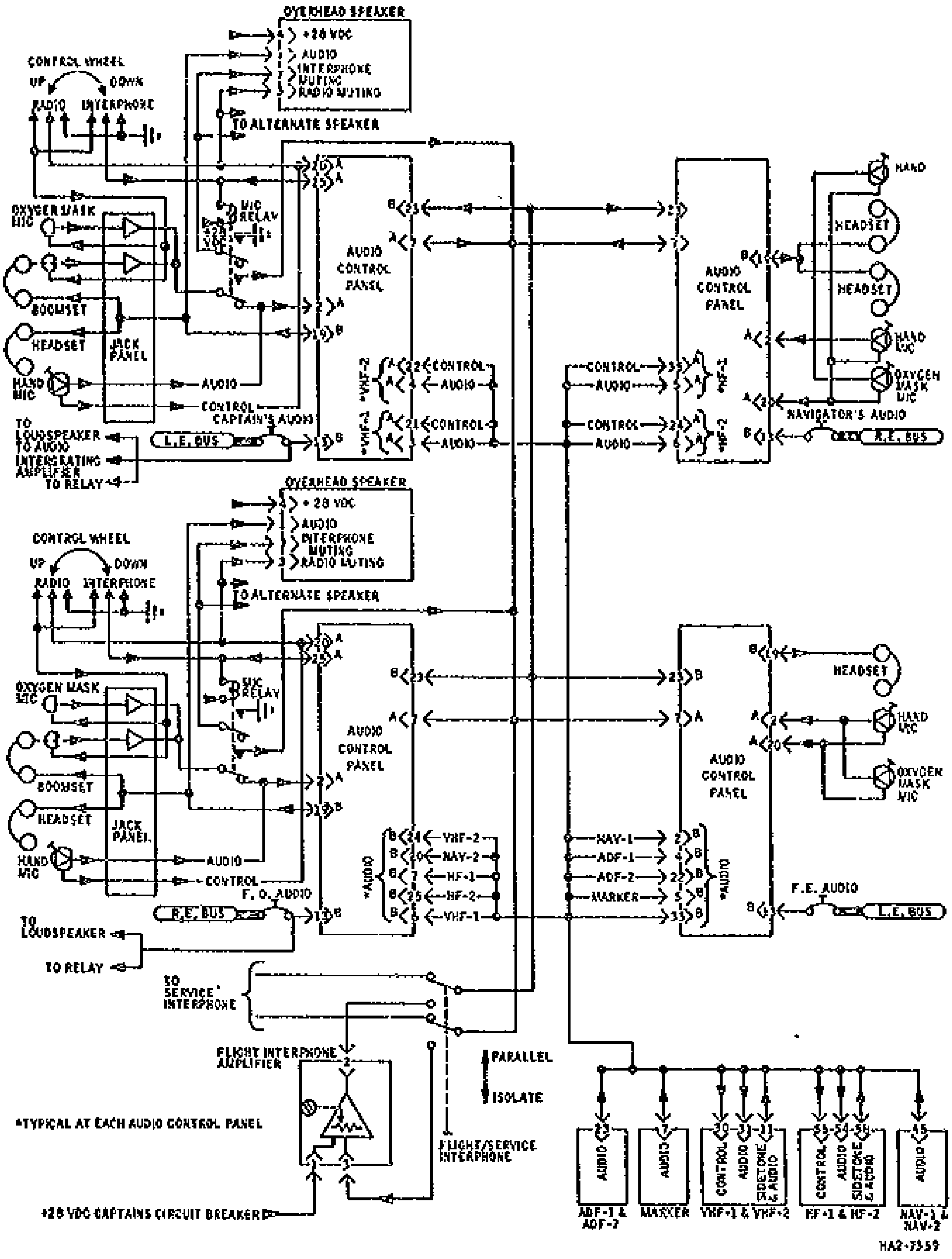
microphone contains an integral audio preamplifier and a push-to-talk switch and is provided with a jack for installation.

G. The microphone jack panels, oxygen mask microphone jack outlets, hand microphone jack outlets, conventional headset jack outlets, and the handset jack outlet are provided for the installation of the headsets, boomsets, and microphones. The microphone jack panels are installed at the captain's and first officer's stations. Each microphone jack panel contains jack outlets for the hand microphone and conventional headset, receptacles for the oxygen mask microphone and the boomset, and audio amplifiers for the oxygen mask microphone and boomset microphone. An adapter is installed in the boomset receptacle to provide a jack outlet for the boomset. The oxygen mask microphone jack outlets are installed at the flight engineer's and navigator's stations. The hand microphone jack outlets are installed at the flight crew and observer's station. The conventional headset jack outlets are installed at the navigator's and observer's stations. The observer's jack outlets are connected in parallel to the navigator's jack outlets. The handset jack outlet is installed in the nosewheel well to provide ground to flight compartment communications. The handset jack outlet is connected to the audio integrating amplifier input and output.

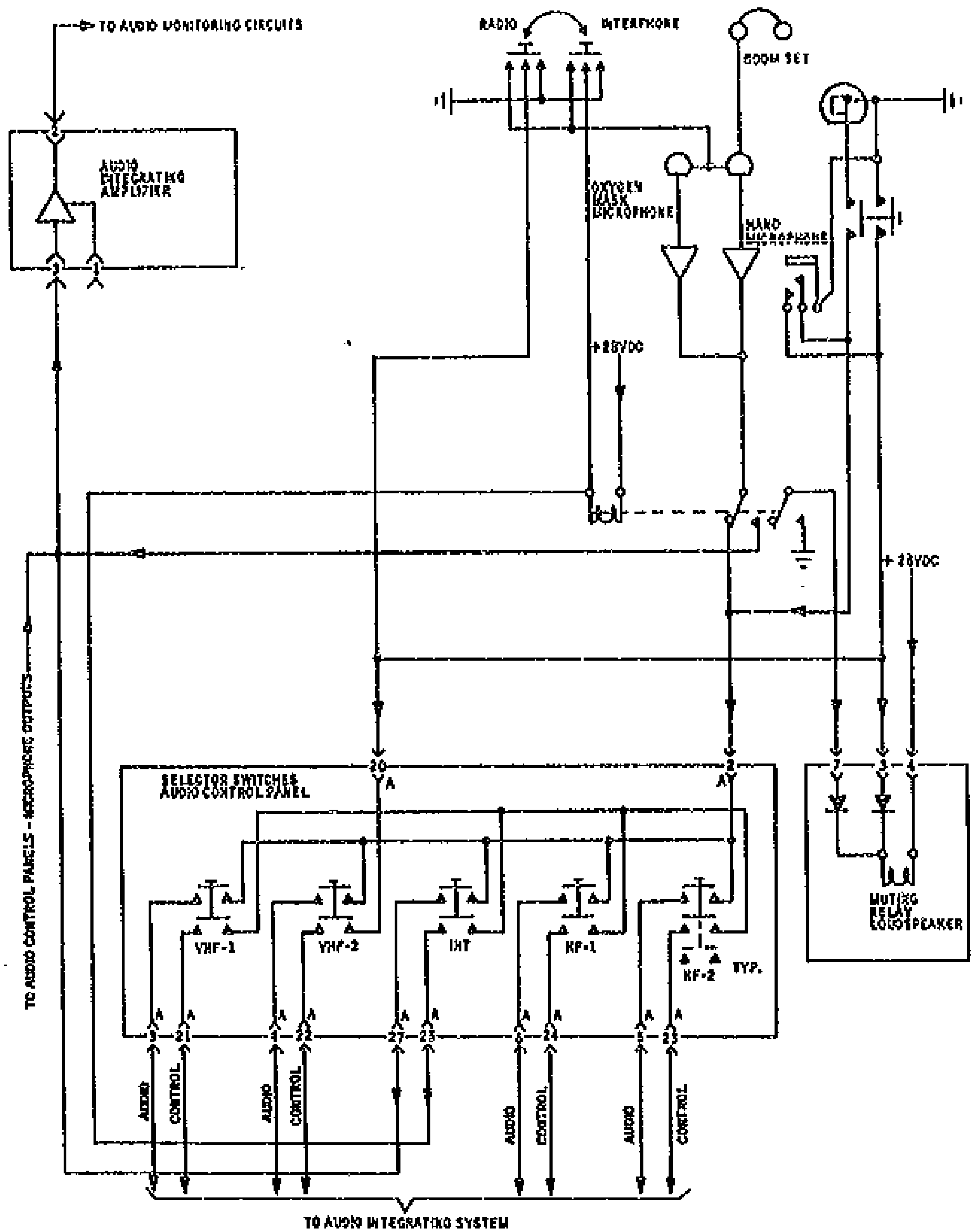
H. The microphone relays provide the captain's and the first officer's boom and oxygen mask microphone audio output control and loudspeaker muting during interphone communications. The captain's microphone relay is installed in the left console and the first officer's microphone relay is installed in the right console. The microphone relay is energized by the control wheel switch in the interphone position or by the hand microphone push-to-talk switch when the interphone microphone selector switch is pressed. (See Figure 2.)

I. The microphone control switches and the Flight/Service Interphone switch are provided for the audio integrating system. A microphone control switch, which provides the captain's and the first officer's boom and oxygen mask microphone control, is installed in the outboard horn of each control wheel. The control wheel switch is placed to the up position for radio communications and in the down position for interphone communications. The Flight/Service Interphone switch, located on the aft pedestal, is used to parallel the flight interphone system with the service interphone system.

J. The audio integrating amplifier provides the necessary audio amplification for flight crew interphone communications. The amplifier contains an input transformer, input gain control, transistorized audio amplifier, and an output transformer. The amplifier input is connected to the audio control panels, microphone relays, nosewheel well jack outlet, and the passenger address emergency announce switch. The amplifier output is connected to the audio control panels and to the nosewheel well jack outlet. A screwdriver access hole is provided through the amplifier to adjust the input gain control. The amplifier is installed in the inboard radio rack on shelf 1 and electrical power is supplied through the captain's audio circuit breaker located on the left dc emergency bus.



Audio Integrating -- Simplified Schematic
Figure 1



Captain's and First Officer's --
Control and Audio Inputs
Figure 2

K. The loudspeakers provide the captain and the first officer a means of monitoring the radio integrating system without the use of the headset or boomset. A loudspeaker is installed overhead at the captain's station and one is installed overhead at the first officer's station. Each loudspeaker contains a transistorized audio amplifier, muting relay, volume control, and a speaker. The audio amplifier amplifies the audio outputs from the associated station audio control panel. The muting relay mutes the speaker to prevent feedback to the microphone. The volume control is external and adjusts the speaker output volume. Electrical power is supplied by the associated station audio circuit breaker on the 28 vdc emergency bus.

2. Operation

A. For interphone operation at the captain's and first officer's stations, the interphone audio control knob is placed in a forward position and the interphone microphone selector switch is pressed. All microphone selector switch internal lamps come on, indicating power is applied to the audio integrating amplifier. Employing the boomset or oxygen mask microphone and placing the control wheel switch to the radio or interphone position energizes the microphone relay. The associated station loudspeaker is muted and microphone audio is routed through the microphone relay to the audio integrating amplifier and is then amplified. Employing the hand microphone and depressing the push-to-talk switch energizes the microphone relay. The associated station loudspeaker is muted and microphone audio is applied to the audio control panel, and routed through the microphone selector switch to the audio integrating amplifier. The amplified audio is applied to the audio control panel and routed through the isolation resistor, audio control knob potentiometer, isolation amplifier, and filter switch to the headset, boomset, and loudspeaker. The interphone microphone selector switch need not be depressed for boomset and oxygen mask microphone interphone communications if the control wheel switch is placed in the interphone position. (See Figure 2.)

B. For interphone operation at the navigator's and flight engineer's station, the interphone audio control knob is placed in a forward position and the interphone microphone selector switch is depressed. All microphone selector switch internal lamps come on, indicating power is applied to the audio integrating amplifier. Employing the hand microphone or the oxygen mask microphone and depressing the integral push-to-talk switch applies microphone audio to the audio control panel. The microphone audio is routed through the microphone selector switch to the audio integrating amplifier and is then amplified. The amplified audio is applied to the audio control panel and routed through the isolation resistor, and audio control knob potentiometer, isolation amplifier, and filter switch to the headsets. (See Figure 3.)

C. To operate the flight interphone system in parallel with the service interphone system, the Flight/Service Interphone switch is placed in the PARALLEL position. During parallel operation, the service interphone amplifier and jack outlets are connected in parallel with the flight interphone system.

D. To monitor the audio inputs to the audio control panels, the audio control knobs are placed in a forward position and the audio monitor switches in on. The audio outputs of the communication transceivers, navigation receivers, and audio integrating amplifier are applied to the audio control panel. Each audio input to the audio control panel is routed through an isolation resistor, an audio control knob potentiometer or switch, the isolation amplifier, and the filter switch to the respective station headset, boomset, and loudspeaker. (See Figure 4.)

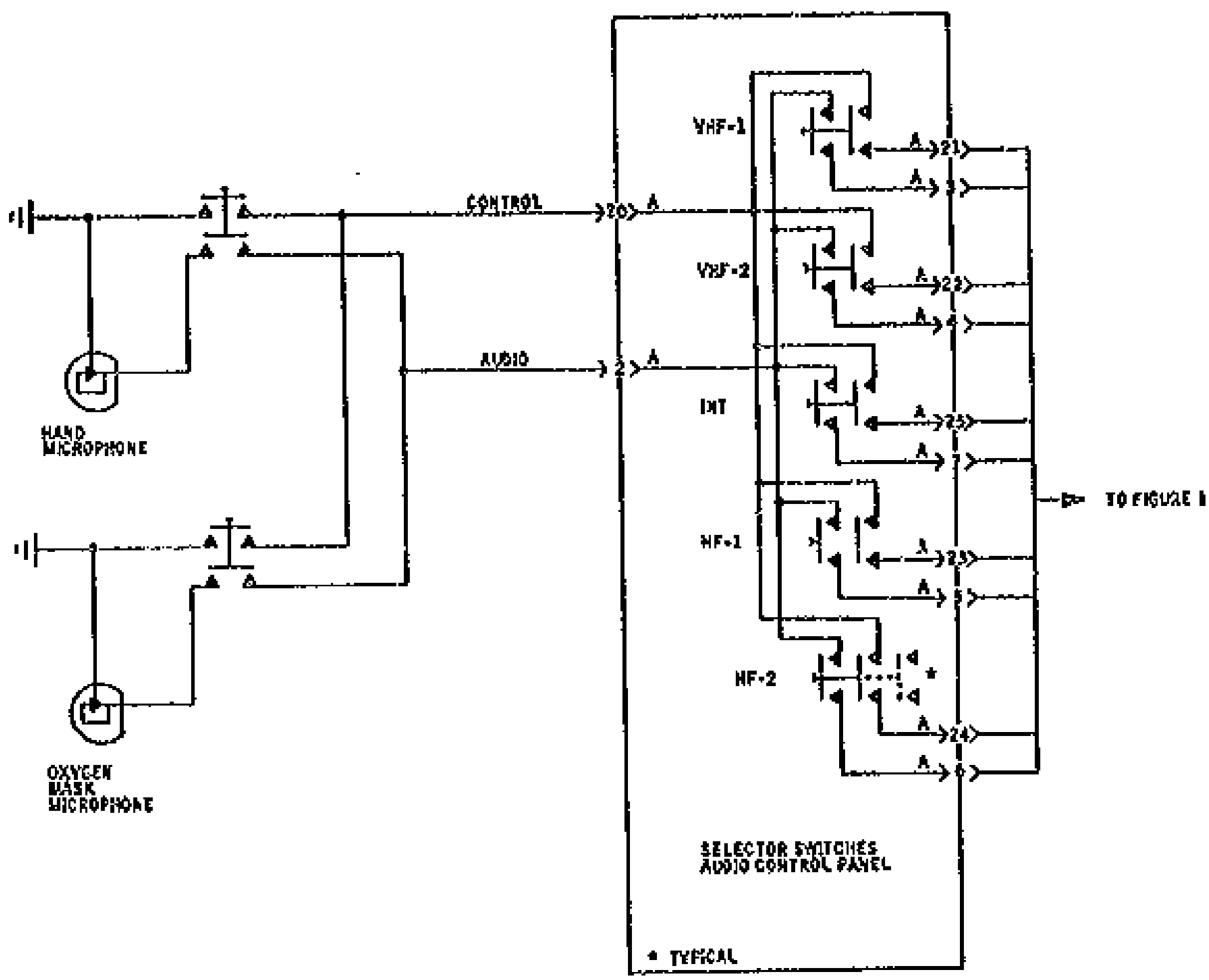
E. For operating a communication transceiver at the captain's station and the first officer's station, the transceiver microphone selector switch is pressed and the transceiver audio control knob is placed in a forward position. Employing the boomset or oxygen mask microphone and placing the control wheel switches in the radio position mutes the loudspeakers and applies the microphone outputs to the audio control panel. Employing the hand microphone and depressing the push-to-talk switch mutes the loudspeakers and applies the microphone outputs to the audio control panel. Employing the hand microphone and depressing the push-to-talk switch mutes the loudspeakers and applies the microphone outputs to the audio control panel. The microphone outputs and transceiver mode control are routed through the microphone selector switch to the transceiver. The transceiver control relays are energized and the transceiver transfers to the transmitting mode of operation. The microphone outputs modulate the transmitter frequency and the output is sampled for sidetone. Sidetone is applied to the audio control panels. Sidetone is routed through an isolation resistor, audio control knob potentiometer, the isolation amplifier, and the filter switch to the headset, boomset, and loudspeaker.

F. For operating a transceiver at the flight engineer's and navigator's stations, the transceiver microphone selector switch is pressed and the audio control knob is placed in a forward position. Employing the hand microphone or oxygen mask microphone and depressing the push-to-talk switch applies microphone outputs and transceiver mode control to the audio control panel. Microphone outputs and transceiver mode control are routed through the microphone selector switch to the transceiver. The transceiver control relays are energized and the transceiver transfers to a transmitter mode of operation. The microphone outputs modulate the transmitter frequency and the output is sampled for sidetone. Sidetone is applied to the audio control panels. Sidetone is routed through an isolation resistor, audio control knob potentiometer, the isolation amplifier, and the filter switch to the headsets.

3. <u>To Operate System</u>

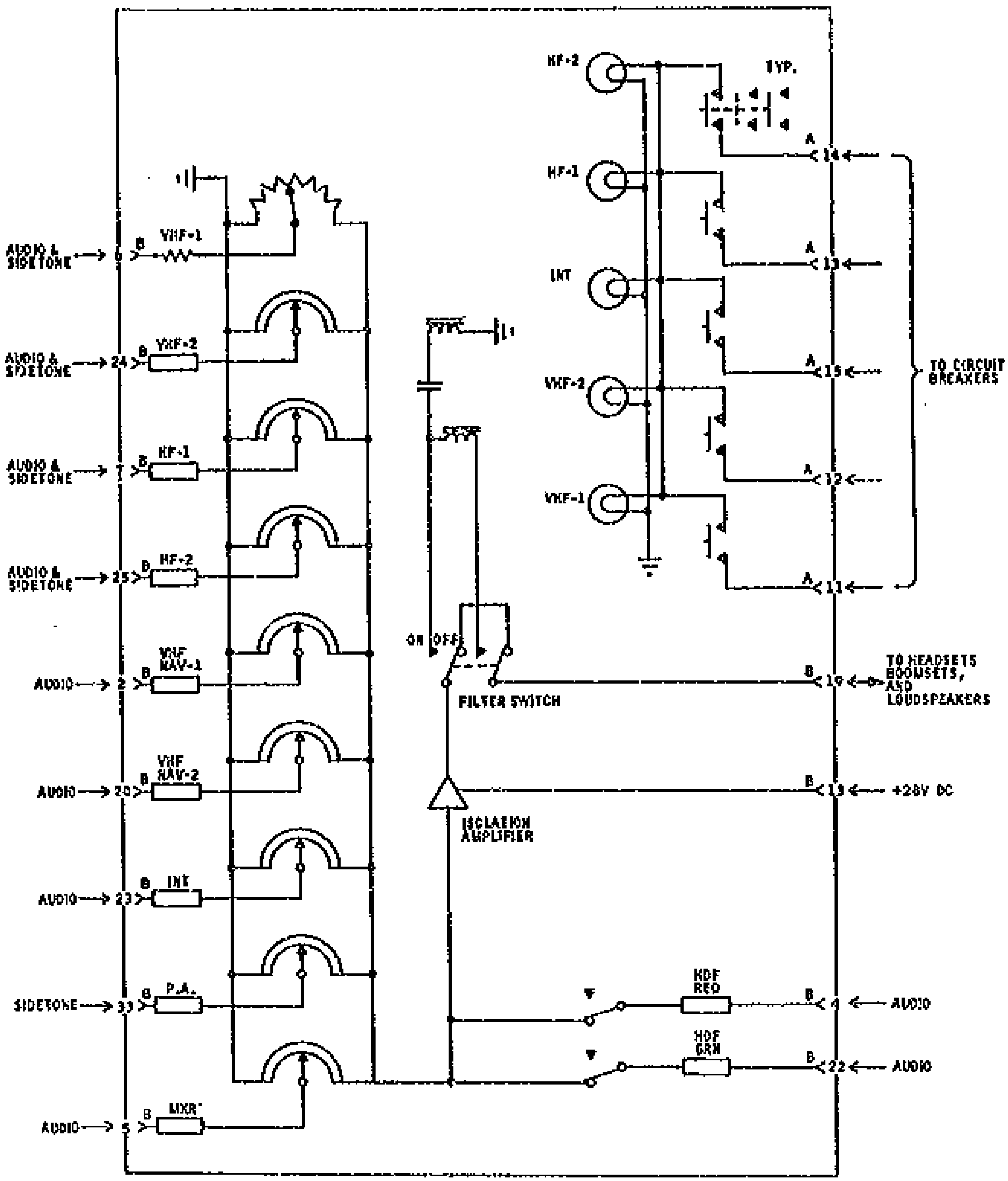
A. To Operate Interphone at Captain's Station and First Officer's Station

(1) Energize electrical buses.



HA3-1729

Flight Engineer's and Navigator's --
Control and Audio Inputs
Figure 3



RA2-3730

Audio Monitoring and Mode Indicating -- Simplified Schematic
Figure 4

(2) Place controls to position indicated.

Control	Position
Flight/Service Interphone switch	ISOLATE
Interphone microphone selector switch	Depressed
Interphone audio control knob	Forward
Boomset or oxygen mask microphone	Employed
Control wheel switches	Radio or interphone
or	
Hand microphone	Employed
Push-to-talk switch	Depressed

(3) Speak into microphone with normal tone and adjust interphone audio control knob to monitor audio at comfortable level.

B. To Operate Interphone at Flight Engineer's Station and Navigator's Station

(1) Energize electrical buses.

(2) Place Flight/Service Interphone switch to ISOLATE position.

(3) Depress interphone microphone selector switch.

(4) Place audio control knob in a forward position.

(5) Employ hand microphone or oxygen mask microphone and depress push-to-talk switch.

(6) Speak into microphone with normal tone and adjust interphone audio control knob to monitor audio at comfortable level.

C. To Monitor Audio

(1) Adjust audio control knobs to monitor audio at comfortable level.

(2) Place audio monitor switches in on.

(3) Adjust loudspeaker volume controls to monitor audio at comfortable level.

D. To Operate Transceivers at Captain's Station and First Officer's Station

(1) Energize electrical buses.

(2) Place controls in position indicated.

Control	Position
Transceiver microphone selector switch	Depressed
Transceiver audio control knob	Forward
Boomset or oxygen mask microphone	Employed
Control wheel switch	Radio
or	
Hand microphone	Employed
Push-to-talk switch	Depressed

(3) Speak into microphone with normal tone and adjust transceiver audio control knob to monitor audio at comfortable level.

E. To Operate Transceiver at Flight Engineer's Station and Navigator's Station

(1) Energize electrical buses.

(2) Depress transceiver microphone selector switch.

(3) Place transceiver audio control knob in forward.

(4) Employ hand microphone or oxygen mask microphone and depress push-to-talk switch.

(5) Speak into microphone with normal tone and adjust transceiver audio control knob to monitor sidetone at comfortable level.

AUDIO INTEGRATING - TROUBLE SHOOTING

1. Trouble Shooting

	Possible Cause	Isolation Procedure	Correction
A.	**NO COMMUNICATON AT ANY STATION**		
(1)	No power	Visually check flight engineer's audio circuit breaker.	Close breaker, if open.
(2)	Faulty audio integrating	Check communications on service interphone. If satisfactory, replace audio integrating amplifier with one known to be serviceable.	Replace faulty amplifier.
(3)	Faulty audio signal wiring	Check audio signal wiring for continuity and absence of grounds.	Repair or replace wiring as necessary.

NOTE: When repairing or replacing audio signal wiring, ground shielding at same ground studs used for original wiring. Use same routing as original when replacing wiring runs.

B. NO COMMUNICATION AT CAPTAIN'S, FIRST OFFICER'S, OR FLIGHT ENGINEER'S STATIONS

NOTE: Step (1) applies to captain's and first officer's stations only.

	Possible Cause	Isolation Procedure	Correction
(1)	No power	Visually check audio integrating circuit breaker.	Close breaker, if open.
(2)	Faulty boomset	Check communications on service interphone, if not operative, check boomset at station known to be operative.	Replace faulty boomset.

Possible Cause	Isolation Procedure	Correction
B. NO COMMUNICATION AT CAPTAIN'S, FIRST OFFICER'S, OR FLIGHT ENGINEER'S STATIONS (Continued)		
(3) Faulty amplifier jack outlet	Employ hand microphone in pendant switch receptacle and check communications on service and flight interphone. If operative, interchange jack outlet with one known to be serviceable.	Replace faulty amplifier jack outlet.
(4) Faulty microphone selector panel	No communications from boomset, oxygen mask microphone and hand microphone when employed in pendant switch receptacle. Remove panel and check for continuity.	Replace faulty microphone selector panel.
(5) Faulty audio control panel	No communications from boomset, oxygen mask microphone, and hand microphone when employed in pendant switch receptacle. Replace audio control panel with one known to be serviceable.	Replace faulty audio control panel.
NOTE: Perform step (6) and omit step (7) at Flight Engineer's station.		
(6) Faulty pendant switch	Employ hand microphone in pendant switch receptacle and check operation.	Replace faulty pendant switch.
(7) Faulty push-to-talk switch, pendant switch or control wheel switch	Check operation of alternate switch. Check for continuity.	Replace defective switch.

Possible Cause	Isolation Procedure	Correction
B. NO COMMUNICATION AT CAPTAIN'S, FIRST OFFICER'S, OR FLIGHT ENGINEER'S STATIONS (Continued)		
(8) Faulty control wiring	Check control wiring for continuity.	Repair or replace control wiring as necessary.
(9) Faulty audio signal wiring	Check audio signal wiring for continuity.	Repair or replace audio signal wiring as necessary.
C. NO COMMUNICATION AT NAVIGATOR'S AND OBSERVER'S STATIONS		
(1) No power	Visually check navigators audio circuit breaker.	Close breaker, if open.
(2) Faulty hand-held microphone	Check hand-held microphone at station known to be serviceable.	Replace hand-held microphone.
(3) Faulty audio control panel	No communications from hand microphone and mask microphone. Replace audio control panel with one known to be serviceable.	Replace faulty audio control panel.
(4) Faulty control wiring	Check control wiring for continuity.	Repair or replace control wiring as necessary.
(5) Faulty audio signal wiring	Check audio signal wiring for continuity and absence of grounds.	Repair or replace audio signal wiring as necessary.

	Possible Causes	Isolation Procedure	Correction
D.	**VOLUME TOO HIGH OR TOO LOW AT CAPTAIN'S, FIRST OFFICER'S, OR FLIGHT ENGINEER'S STATION**		
(1)	Defective amplifier jack outlet or adjustment	Adjust amplifier jack outlet. (See 23-50-2.)	If adjustment does not correct problem, replace faulty amplifier jack outlet.
E.	**VOLUME TOO HIGH OR TOO LOW AT ALL STATIONS**		
(1)	Defective audio integrating amplifier or adjustment	Adjust amplifier. (See 23-50-3.)	If adjustment does not correct problem, replace faulty amplifier.
F.	**NO TRANSMISSION, NOISE, LOW VOLUME, OR RECEPTION AT ONE STATION**		
(1)	Controls on audio control panel improperly positioned	Check position of controls.	Position controls as follows: Microphone selector to desired transceiver. Selected transceiver control knob to mid position, and all others off.
G.	**NO COMMUNICATIONS AT NOSE WHEEL WELL**		
(1)	Faulty handset	Replace handset with one known to be serviceable.	Replace faulty handset.

Possible Causes	Isolation Procedure	Correction
G. NO COMMUNICATIONS AT NOSE WHEEL WELL (Continued)		
(2) Faulty jack outlet	Check jack outlet for continuity.	Replace faulty jack outlet.
(3) Faulty audio signal wiring	Check wiring for continuity.	Repair or replace wiring as necessary.

AUDIO INTEGRATING - TROUBLE SHOOTING

1. Trouble Shooting

	Possible Causes	Isolation Procedure	Correction
A.	**NO INTERPHONE COMMUNICATIONS AT ANY STATION**		
(1)	No power	Selector switch lamps do not come on when interphone selector switch is depressed. Visually check captain's circuit breaker.	Close circuit breaker, if open.
(2)	Faulty wiring, 28 vdc supply	Check for continuity on audio control 28 vdc input to audio control panel interphone selector switch lamp input.	Repair or replace wiring as necessary.
(3)	Faulty audio integrating amplifier	Interchange amplifier with one known to be serviceable.	Replace faulty amplifier.
(4)	Faulty wiring, audio signal	Check for continuity on audio control panel interphone microphone output to amplifier audio input and on audio control panel interphone audio input to amplifier audio output.	Repair or replace wiring as necessary.
(5)	Grounded wiring, audio signal	Check for no continuity on ground to audio control panel microphone audio output and on ground to audio control panel interphone audio input.	Isolate wiring from ground.

NOTE: When repairing or placing audio signal wiring, ground shielding at same ground studs used for original wiring. Use same routing as original when replacing wiring runs.

Possible Causes	Isolation Procedure	Correction
B. BOOMSET MICROPHONE OR OXYGEN MASK MICROPHONE INOPERATIVE ON INTERPHONE COMMUNICATIONS OR RADIO COMMUNICATIONS		
(1) Faulty boomset or oxygen mask	Check unit at station known to be serviceable.	Replace faulty unit.
(2) Faulty jack panel	Interchange unit with one known to be serviceable.	Replace faulty unit.
(3) Faulty wiring, audio signal	Check for continuity on jack panel connector and boomset microphone output to mask microphone output.	Repair or replace wiring as necessary.
(4) Faulty wiring, microphone audio return	Check for continuity on jack panel connector and boomset microphone return to mask microphone return.	Repair or replace wiring as necessary.
C. BOOMSET MICROPHONE AND OXYGEN MASK MICROPHONE INOPERATIVE ON SERVICE INTERPHONE COMMUNICATIONS WITH TRANSCEIVER SELECTED		
(1) Faulty control wheel switch, or associated wiring	Check for continuity on switch to ground and on switch to relay coil return. Actuate control wheel interphone switch and check for continuity on relay coil return to ground.	Replace faulty switch, or repair or replace wiring as necessary.
(2) Faulty microphone relay	Depress interphone selector switch; if microphone operative, check relay coil resistance. Check for 28 vdc at high side of relay coil.	Replace relay.
(3) Faulty wiring	Check for 28 vdc at relay coil high side.	Repair or replace wiring as necessary.

Possible Causes	Isolation Procedure	Correction
D. ALL MICROPHONES INOPERATIVE ON RADIO COMMUNICATIONS		
(1) Faulty control wheel switch or associated wiring	Check for continuity on switch to ground and on switch to audio control panel microphone input control. Actuate radio control wheel switch and check for continuity on audio control panel microphone input control to ground.	Replace switch, or repair or replace wiring as necessary.
(2) Faulty audio control panel	Interchange control panel with one known to be serviceable.	Replace faulty audio control panel.
E. NO COMMUNICATIONS FROM HAND MICROPHONE AT CAPTAIN'S OR FIRST OFFICER'S STATIONS		
(1) Faulty hand microphone	Check unit at station known to be serviceable.	Replace faulty unit.
(2) Faulty jack panel	Check hand microphone in console jack outlet; if microphone operative, interchange jack panel with one known to be serviceable.	Replace faulty unit.
(3) Faulty audio signal wiring	Check continuity on jack panel outlet ring connection to console jack outlet ring connection.	Repair or replace wiring as necessary.

	Possible Causes	Isolation Procedure	Correction
F.	**NO COMMUNICATIONS AT ENGINEER'S, NAVIGATOR'S, OR OBSERVER'S STATION**		
(1)	Faulty hand microphone or oxygen mask microphone	Check unit at jack outlet known to be serviceable.	Replace faulty unit.
(2)	Faulty jack outlet	Visually check jack outlet. Check for continuity on jack outlet to jack outlet known to be serviceable.	Replace faulty unit.
(3)	Faulty audio control panel	Interchange unit with one known to be serviceable.	Replace faulty unit.
(4)	Faulty wiring, audio signal	Check for continuity on jack outlet to audio control panel.	Repair or replace wiring as necessary.
G.	**VOLUME TOO HIGH OR TOO LOW AT ALL STATIONS**		
(1)	Faulty amplifier, or amplifier out of adjustment	Adjust amplifier. (See 23-50-2.)	If adjustment is not satisfactory, replace amplifier.

AUDIO INTEGRATING - TROUBLE SHOOTING

1 Trouble Shooting

Possible Causes	Isolation Procedure	Correction
A. NO INTERPHONE COMMUNICATION AT ANY STATION		
(1) Faulty audio amplifier	Interchange amplifier with one known to be serviceable.	Replace faulty amplifier.
(2) Faulty audio amplifier input wiring	Check interphone communication from jack outlets. If satisfactory, check input wiring for continuity and for absence of grounds.	Repair or replace faulty wiring as necessary.
(3) Faulty audio amplifier output wiring	Service interphone communication from outlets inoperative. Check output wiring for continuity and for absence of grounds.	Repair or replace faulty wiring as necessary.

NOTE: When repairing or replacing audio signal wiring, ground shielding at same ground studs used for original wiring. Use routing as original when replacing wiring runs.

Possible Causes	Isolation Procedure	Correction
B. NO INTERPHONE COMMUNICATION AT ONE STATION		
(1) Faulty hand microphone	Check hand microphone at station known to be serviceable.	Replace faulty hand microphone.
(2) Faulty headset	Check headset at station known to be serviceable.	Replace faulty headset.
(3) Faulty audio control panel.	Interchange audio control panel with one known to be serviceable.	Replace faulty audio control panel.

	Possible Causes	Isolation Procedure	Correction
C.	**NO TRANSCEIVER COMMUNICATION AT ANY STATION**		
(1)	Faulty transceiver	Check transceiver operation with hand microphone and headset at transceiver. If operation is not satisfactory, interchange transceiver with one known to be serviceable.	Replace faulty transceiver.
(2)	Faulty interface wiring between audio control panels and transceiver.	Local transceiver operation satisfactory. Check interface wiring for continuity and for absence of grounds.	Repair or replace faulty wiring as necessary.
D.	**NO TRANSCEIVER COMMUNICATION AT ONE STATION**		
(1)	Faulty audio control panel	Check interphone communication, if satisfactory, interchange audio control panel with one known to be serviceable.	Replace faulty audio control panel.
E.	**INTERPHONE VOLUME TOO HIGH OR TOO LOW AT ALL STATIONS**		
(1)	Faulty audio amplifier	Check interphone operation from interphone jack outlets. If not satisfactory, interchange audio amplifier with one known to be serviceable.	Replace faulty audio amplifier.
(2)	Faulty flight volume control adjustment	Interphone jack outlet interphone communication satisfactory.	Adjust flight volume control.

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AUDIO INTEGRATING - TROUBLE SHOOTING

1. Trouble Shooting

Possible Cause	Isolation Procedure	Correction
A. NO INTERPHONE COMMUNICATION AT ANY STATION		
(1) No power	Visually check flight and service interphone circuit breaker.	Close breaker, if open.
(2) Faulty audio	Replace amplifier with one known to be serviceable.	Replace faulty amplifier.
(3) Faulty audio signal wiring	Check audio signal wiring for continuity and absence of grounds.	Repair or replace wiring as necessary.
NOTE: When repairing or replacing audio signal wiring, ground shielding at same ground studs used for original wiring. Use same routing as original when replacing wiring runs.		
B. NO TRANSCEIVER COMMUNICATION AT ANY STATION		
(1) No power	Visually check audio circuit breakers.	Close breaker, if open.
(2) Faulty transceiver	Check applicable transceiver operation at transceiver. If unsatisfactory interchange transceiver with one known to be serviceable.	Replace faulty transceiver.

	Possible Cause	Isolation Procedure	Correction
C.	NO TRANSCEIVER COMMUNICATION AT ONE STATION		
(1)	Faulty microphone	Check microphone at station known to be serviceable.	Replace faulty microphone.
(2)	Faulty microphone selector panel	No communications from boomset, oxygen or smoke mask microphone at captain's or first officer's station. Remove panel and check for continuity.	Replace faulty microphone selector panel.
(3)	Faulty audio control panel	No communications from boomset, oxygen or smoke mask microphone. Replace audio control panel with one known to be serviceable.	Replace faulty audio control panel.
(4)	Faulty push-to-talk switch.	Check operation of switch. Check for continuity.	Replace defective switch.

AUDIO INTEGRATING - TROUBLE SHOOTING

1. Trouble Shooting

Possible Causes	Isolation Procedure	Correction
A. NO INTERPHONE COMMUNICATION AT ANY STATION		
(1) No power	Visually check interphone circuit breaker.	Close breaker, if open.
(2) Faulty audio	Replace amplifier with one known to be serviceable.	Replace faulty amplifier
(3) Faulty audio signal wiring	Check audio signal wiring for continuity and absence of grounds.	Repair or replace wiring as necessary
NOTE: When repairing or replacing audio signal wiring, ground shielding at same ground studs used for original wiring. Use same routing as original when replacing wiring runs.		
B. NO TRANSCEIVER COMMUNICATION AT ANY STATION		
(1) No power	Visually check transceiver circuit breakers.	Close breaker, if open
(2) Faulty transceiver	Check applicable transceiver operation at transceiver. If unsatisfactory interchange transceiver with one known to be serviceable.	Replace faulty transceiver
C. NO TRANSCEIVER COMMUNICATION AT ONE STATION		
(1) Faulty	Check microphone at station known to be serviceable.	Replace faulty

Possible Cause	Isolation Procedure	Correction
C. NO TRANSCEIVER COMMUNICATION AT ONE STATION (Continued)		
(2) Faulty Control panel microphone selector switch	No communications from boomset or oxygen microphone at captain's or first officer's station.	Replace faulty audio control panel
(3) Faulty audio control panel	No communications from boomset or oxygen microphone. Replace audio control panel with one known to be serviceable.	Replace faulty audio control panel
(4) Faulty push-to-talk switch	Check operation of switch Check for continuity.	Replace defective switch

AUDIO INTEGRATING - TROUBLE SHOOTING

1. Trouble Shooting

	Possible Causes	Isolation Procedure	Correction
A. NO INTERPHONE COMMUNICATION AT ANY STATION			
(1)	Faulty audio amplifier	Interchange amplifier with one known to be serviceable.	Replace faulty amplifier
(2)	Faulty audio amplifier input wiring	Check input wiring for continuity and for absence of grounds.	Repair or replace faulty wiring as necessary
(3)	Faulty audio amplifier output wiring	Check output wiring for continuity and for absence of grounds.	Repair or replace faulty wiring as necessary
	NOTE: When repairing or replacing audio signal wiring, ground shielding at same ground studs used for original wiring. Use routing as original when replacing wiring runs.		
B. NO INTERPHONE COMMUNICATION AT ONE STATION			
(1)	Faulty hand microphone	Check hand microphone at station known to be serviceable.	Replace faulty hand microphone
(2)	Faulty headset	Check headset at station known to be serviceable.	Replace faulty headset
(3)	Faulty audio control panel	Interchange audio control panel with one known to be serviceable.	Replace faulty audio control panel

Possible Causes	Isolation Procedure	Correction

C. NO RADIO COMMUNICATION AT ANY STATION

Possible Causes	Isolation Procedure	Correction
(1) Faulty transmitter/ receiver	Check radio operation at transmitter/receiver with hand microphone and head-set. If operation is not satisfactory, interchange as applicable, transmitter, receiver, or transceiver with one known to be serviceable.	Replace faulty unit: transmitter, receiver, or transceiver
(2) Faulty interface between audio control panels and transmitter/ receiver	Local transmitter/receiver operation satisfactory. Check interface wiring for continuity and for absence of grounds.	Repair or replace faulty wiring as necessary

D. NO RADIO COMMUNICATION AT ONE STATION

Possible Causes	Isolation Procedure	Correction
(1) Faulty audio control panel	Check interphone communication, if satisfactory, interchange audio control panel with one known to be serviceable.	Replace faulty audio control panel

E. INTERPHONE VOLUME TOO HIGH OR TOO LOW AT ALL STATIONS

Possible Causes	Isolation Procedure	Correction
(1) Faulty audio amplifier	Check interphone operation from interphone jack outlets. If not satisfactory, interchange audio amplifier with one known to be serviceable.	Replace faulty audio amplifier
(2) Faulty volume control a adjustment	Interphone jack outlet interphone communication unsatisfactory.	Adjust volume control

Possible Causes	Isolation Procedure	Correction

F. SPEAKER AMPLIFIER INOPERATIVE

Possible Causes	Isolation Procedure	Correction
(1) Faulty speaker amplifier	Interchange speaker-amplifier with one known to be serviceable.	Replace faulty speaker amplifier
(2) Faulty wiring between speaker-amplifier and control panel	Check input wiring for continuity and for absence of grounds.	Repair or replace faulty wiring as necessary

G. CAPTAIN'S OR FIRST OFFICER'S SPEAKER-AMPLIFIER FAILS TO MUTE

Possible Causes	Isolation Procedure	Correction
(1) Faulty speaker-amplifier	Check speaker amplifier muting by activating push-to-talk switch on captain's control wheel and lifting handset from cockpit handset hanger switch. If operation unsatisfactory on both checks, interchange speaker amplifier with one known to be serviceable.	Replace faulty speaker-amplifier
(2) Faulty wiring between control wheel push-to-talk switch and speaker-amplifier	Check wiring for continuity and absence of grounds between control wheel switch and speaker-amplifier.	Repair or replace faulty wiring as necessary
(3) Faulty wiring between speaker-amplifier and cockpit handset hanger switch	Check wiring for continuity and absence of grounds between speaker-amplifier and cockpit handset hanger switch.	Repair or replace faulty wiring as necessary

AUDIO INTEGRATING - TROUBLE SHOOTING

1. Trouble Shooting

Possible Causes	Isolation Procedure	Correction
A. NO INTERPHONE COMMUNICATION AT ANY STATION		
(1) Faulty audio amplifier	Interchange amplifier with one known to be serviceable.	Replace faulty amplifier
(2) Faulty audio amplifier input wiring	Check input wiring for continuity and for absence of grounds.	Repair or replace faulty wiring as necessary
(3) Faulty audio amplifier output wiring	Check output wiring for continuity and for absence of grounds.	Repair or replace faulty wiring as necessary
NOTE: When repairing or replacing audio signal wiring, ground shielding at same ground studs used for original wiring. Use routing as original when replacing wiring runs.		
B. NO INTERPHONE COMMUNICATION AT ONE STATION		
(1) Faulty hand microphone	Check hand microphone at station known to be serviceable.	Replace faulty hand microphone
(2) Faulty headset	Check headset at station known to be serviceable.	Replace faulty headset
(3) Faulty audio control panel	Interchange audio control panel with one known to be serviceable.	Replace faulty audio control panel

Possible Causes	Isolation Procedure	Correction

C. NO RADIO COMMUNICATION AT ANY STATION

	Possible Causes	Isolation Procedure	Correction
(1)	Faulty transmitter/ receiver	Check radio operation at transmitter/receiver with hand microphone and head-set. If operation is not satisfactory, interchange, as applicable transmitter, receiver, or transceiver with one known to be serviceable.	Replace faulty unit: transmitter, receiver, or transceiver
(2)	Faulty interface wiring between audio control panels and transmitter/ receiver.	Local transmitter/receiver operation satisfactory: Check interface wiring for continuity and for absence of grounds.	Repair or replace faulty wiring as necessary

D. NO RADIO COMMUNICATION AT ONE STATION

	Possible Causes	Isolation Procedure	Correction
(1)	Faulty audio control panel	Check interphone communication, if satisfactory interchange audio control panel with one known to be serviceable.	Replace faulty audio control panel

E. INTERPHONE VOLUME TO HIGH OR TO LOW AT ALL STATIONS

	Possible Causes	Isolation Procedure	Correction
(1)	Faulty interphone amplifier	Check interphone operation from jack outlets. If not satisfactory, interchange interphone amplifier with one known to be serviceable.	Replace faulty interphone amplifier
(2)	Faulty interphone audio level adjustment	Interphone jack outlet audio level unsatisfactory.	Adjust interphone audio level control

Possible Cause	Isolation Procedure	Correction
F. SPEAKER INOPERATIVE		
(1) Faulty speaker amplifier	Interchange interphone amplifier with one known to be serviceable.	Replace faulty interphone amplifier.
NOTE: Speaker amplifiers are modules within the interphone amplifier chassis.		
(2) Faulty wiring between speaker, speaker amplifier, or audio control panel.	Check wiring for continuity and absence of grounds.	Repair or replace faulty wiring as necessary.
G. CAPTAIN'S SPEAKER FAILS TO MUTE		
(1) Faulty audio control panel	Check speaker muting by activating push-to-talk switch on the captain's control wheel. Ensure audio control panel controls are properly positioned.	Replace faulty audio control panel
(2) Faulty wiring between control wheel push-to-talk switch and audio control panel	Check wiring for continuity and absence of grounds.	Repair or replace wiring as necessary
H. FIRST OFFICER'S SPEAKER FAILS TO MUTE		
(1) Faulty audio control panel	Check speaker muting by activating push-to-talk switch on the first officer's control wheel. Ensure audio control panel controls are properly positioned.	Replace faulty audio control panel

Possible Cause	Isolation Procedure	Correction

H. FIRST OFFICER'S SPEAKER FAILS TO MUTE (Continued)

Possible Cause	Isolation Procedure	Correction
(2) Faulty wiring between control wheel push-to-talk switch and audio control panel	Check wiring for continuity and absence of grounds.	Repair or replace faulty wiring as necessary

AUDIO INTEGRATING - TROUBLE SHOOTING

1. Trouble Shooting

Possible Cause	Isolation Procedure	Correction
A. NO INTERPHONE COMMUNICATION AT ANY STATION		
(1) No power	Visually check audio circuit breakers.	Close breaker, if open
(2) Faulty audio	Replace amplifier with one known to be serviceable.	Replace faulty amplifier
(3) Faulty audio signal wiring	Check audio signal wiring for continuity and absence of grounds.	Repair or replace wiring as necessary
NOTE: When repairing or replacing audio signal wiring, ground shielding at same ground studs used for original wiring. Use same routing as original when replacing wiring runs.		
B. NO TRANSCEIVER COMMUNICATION AT ANY STATION		
(1) No power	Visually check audio circuit breakers.	Close breaker, if open
(2) Faulty transceiver	Check applicable transceiver operation at transceiver. If unsatisfactory, interchange transceiver with one known to be serviceable.	Replace faulty transceiver
C. NO TRANSCEIVER COMMUNICATION AT ONE STATION		
(1) Flight engineer's audio selector switch	Check position of audio selector switch.	Place audio selector switch to normal position

Possible Cause	Isolation Procedure	Correction
C. NO TRANSCEIVER COMMUNICATION AT ONE STATION (Continued)		
(2) Faulty microphone	Check microphone at station known to be serviceable.	Replace faulty microphone
(3) Faulty control panel microphone selector panel switch	No communications from oxygen or hand microphones.	Replace faulty audio control panel
(4) Faulty audio control panel	No communications from oxygen or hand microphone. Replace audio control panel with one known to be serviceable.	Replace faulty audio control panel
(5) Faulty push-to-talk switch	Check operation of switch. Check for continuity.	Replace defective switch

AUDIO INTEGRATING - TROUBLE SHOOTING

1. Trouble Shooting

Possible Cause	Isolation Procedure	Correction
A. NO INTERPHONE COMMUNICATION AT ANY STATION		
(1) No power	Visually check audio circuit breakers.	Close breaker, if open
(2) Faulty audio	Replace amplifier with one known to be serviceable.	Replace faulty amplifier
(3) Faulty audio signal wiring	Check audio signal wiring for continuity and absence of grounds.	Repair or replace wiring as necessary
NOTE: When repairing or replacing audio signal wiring, ground shielding at same ground studs used for original wiring. Use same routing as original when replacing wiring runs.		
B. NO TRANSCEIVER COMMUNICATION AT ANY STATION		
(1) No power	Visually check audio circuit breakers.	Close breaker, if open
(2) Faulty transceiver	Check applicable transceiver operation at transceiver. If unsatisfactory interchange transceiver with one known to be serviceable.	Replace faulty transceiver
C. NO TRANSCEIVER COMMUNICATION AT ONE STATION		
(1) Faulty microphone	Check microphone at station known to be serviceable.	Replace faulty microphone

Possible Cause	Isolation Procedure	Correction
C. NO TRANSCEIVER COMMUNICATION AT ONE STATION (Continued)		
(2) Faulty control panel microphone selector switch	No communications from hand or mask microphone at captain's or first officer's station.	Replace faulty audio control panel
(3) Faulty audio control panel	No communications from hand or smoke mask microphone. Replace audio control panel with one known to be serviceable.	Replace faulty audio control panel
(4) Faulty push-to-talk switch	Check operation of switch. Check for continuity.	Replace faulty switch

AUDIO INTEGRATING - TROUBLE SHOOTING

1. Trouble Shooting

	Possible Causes	Isolation Procedure	Correction
A. NO INTERPHONE COMMUNICATION AT ANY STATION			
(1)	Faulty audio amplifier	Interchange amplifier with one known to be serviceable.	Replace faulty amplifier
(2)	Faulty audio amplifier output wiring	Flight interphone communication from audio jack boxes inoperative. Check output wiring for continuity and for absence of grounds.	Repair or replace faulty wiring as necessary

NOTE: When repairing or replacing audio signal wiring, ground shielding at same ground studs used for original wiring. Use routing as original when replacing wiring runs.

	Possible Causes	Isolation Procedure	Correction
B. NO INTERPHONE COMMUNICATION AT ONE STATION			
(1)	Faulty hand microphone	Check hand microphone at station known to be serviceable.	Replace faulty hand microphone
(2)	Faulty headset	Check headset at station known to be serviceable.	Replace faulty headset
(3)	Faulty audio control panel	Interchange audio control panel with one known to be serviceable.	Replace faulty audio control panel
(4)	Faulty audio amplifier input wiring	Check input wiring for continuity and for absence of grounds.	Repair or replace faulty wiring as necessary

Possible Causes	Isolation Procedure	Correction
C. NO TRANSCEIVER COMMUNICATION AT ANY STATION		
(1) Faulty transceiver	Check transceiver operation with hand microphone and headset at transceiver. If operation is not satisfactory, interchange transceiver with one known to be serviceable.	Replace faulty transceiver
(2) Faulty interface wiring between audio control panels and transceiver	Local transceiver operation satisfactory. Check interface wiring for continuity and for absence of grounds.	Repair or replace faulty wiring as necessary
D. NO TRANSCEIVER COMMUNICATION AT ONE STATION		
(1) Faulty audio control panel	Check interphone communication, if satisfactory, interchange audio control panel with one known to be serviceable.	Replace faulty audio control panel
E. INTERPHONE VOLUME TOO HIGH OR TOO LOW AT ALL STATIONS		
(1) Faulty audio amplifier	Check interphone operation from interphone audio jack boxes. If not satisfactory, interchange audio amplifier with one known to be serviceable.	Replace faulty audio amplifier

AUDIO INTEGRATING - TROUBLE SHOOTING

1. Trouble Shooting

	Possible Causes	Isolation Procedure	Correction
A. NO INTERPHONE COMMUNICATION AT ANY STATION			
(1)	Faulty audio amplifier	Interchange amplifier with one known to be serviceable	Replace faulty amplifier
(2)	Faulty audio amplifier input wiring	Check input wiring for continuity and for absence of grounds	Repair or replace faulty wiring as necessary
(3)	Faulty audio amplifier output wiring	Check output wiring for continuity and for absence of grounds	Repair or replace faulty wiring as necessary
	NOTE: When repairing or replacing audio signal wiring, ground shielding at same ground studs used for original wiring. Use routing as original when replacing wiring runs.		
B. NO INTERPHONE COMMUNICATION AT ONE STATION			
(1)	Faulty hand microphone	Check hand microphone at station known to be serviceable	Replace faulty hand microphone
(2)	Faulty headset	Check headset at station known to be serviceable	Replace faulty headset
(3)	Faulty audio control panel	Interchange audio control panel with one known to be serviceable	Replace faulty audio control panel
C. NO TRANSCEIVER COMMUNICATION AT ANY STATION			
(1)	Faulty transceiver	Check transceiver operation with hand microphone and headset at transceiver. If operation is not satisfactory,	Replace faulty transceiver

Possible Causes	Isolation Procedure	Correction
C. NO TRANSCEIVER COMMUNICATION AT ANY STATION (Continued)		
	interchange transceiver with one known to be serviceable	
(2) Faulty interface wiring between audio control panels and transceiver	Local transceiver operation satisfactory. Check interface wiring for continuity and for absence of grounds	Repair or replace faulty wiring as necessary
D. NO TRANSCEIVER COMMUNICATION AT ONE STATION		
(1) Faulty audio control panel	Check interphone communication, if satisfactory, interchange audio control panel with one known to be serviceable	Replace faulty audio control panel.
E. INTERPHONE VOLUME TOO HIGH OR TOO LOW AT ALL STATIONS		
(1) Faulty volume control adjustment	Interphone jack outlet interphone communication unsatisfactory	Adjust volume control
(2) Faulty audio amplifier	Check interphone operation from interphone jack outlets. If not satisfactory, interchange audio amplifier with one known to be serviceable	Replace faulty audio amplifier
F. SPEAKER AMPLIFIER INOPERATIVE		
(1) Faulty speaker amplifier	Interchange speaker-amplifier with one known to be serviceable	Replace faulty speaker amplifier

Possible Causes	Isolation Procedure	Correction
F. SPEAKER AMPLIFIER INOPERATIVE (Continued)		
(2) Faulty wiring between speaker-amplifier and control panel	Check input wiring for continuity and for absence of grounds	Repair or replace faulty wiring as necessary
G. CAPTAIN'S OR FIRST OFFICER'S SPEAKER-AMPLIFIER FAILS TO MUTE		
(1) Faulty speaker-amplifier	Check speaker amplifier muting by activating push-to-talk switch on captains control wheel and lifting handset from cockpit handset hanger switch. If operation unsatisfactory on both checks, interchange speaker amplifier with one known to be serviceable	Replace faulty speaker-amplifier
(2) Faulty wiring between control wheel push-to-talk switch and speaker-amplifier	Check wiring for continuity and absence of grounds between control wheel switch and speaker-amplifier	Repair or replace faulty wiring as necessary
(3) Faulty wiring between speaker-amplifier and cockpit handset hanger switch	Check wiring for continuity and absence of grounds between speaker-amplifier and cockpit handset hanger switch	Repair or replace faulty wiring as necessary

AUDIO INTEGRATING - TROUBLE SHOOTING

1. Trouble Shooting

Possible Cause	Isolation Procedure	Correction
A. NO INTERPHONE COMMUNICATION AT ANY STATION		
(1) No power	Visually check audio circuit breakers.	Close breaker, if open
(2) Faulty audio	Replace amplifier with one known to be serviceable.	Replace faulty amplifier
(3) Faulty audio signal wiring	Check audio signal wiring for continuity and absence of grounds.	Repair or replace wiring as necessary
NOTE: When repairing or replacing audio signal wiring, ground shielding at same ground studs used for original wiring. Use same routing as original when replacing wiring runs.		
B. NO INTERPHONE COMMUNICATION AT ONE STATION.		
(1) Faulty microphone	Check microphone at station known to be serviceable.	Replace faulty microphone
(2) Faulty headset	Check headset at station known to be serviceable.	Replace faulty headset
(3) Faulty audio control panel	Interchange audio control panel with one known to be serviceable.	Replace faulty audio control panel
(4) Faulty audio amplifier input wiring	Check input wiring for continuity and for absence of grounds.	Repair or replace faulty wiring as necessary

Possible Cause	Isolation Procedure	Correction
C. NO RADIO COMMUNICATION AT ANY STATION		
(1) Faulty transceiver	Check transceiver operation with hand microphone and headset at transceiver. If operation is not satisfactory, interchange transceiver with one known to be serviceable.	Replace faulty transceiver
(2) Faulty interface wiring between audio control panels and transceiver	Local transceiver operation satisfactory. Check interface wiring for continuity and for absence of grounds.	Repair or replace faulty wiring as necessary
D. NO RADIO COMMUNICATION AT ONE STATION		
(1) Faulty audio control panel	Check interphone communication, if satisfactory, interchange audio control panel with one known to be serviceable.	Replace faulty audio control panel
E. INTERPHONE VOLUME TOO HIGH OR TOO LOW AT ALL STATIONS		
(1) Faulty volume control adjustment	Interphone jack outlet interphone communication unsatisfactory	Adjust volume control
(2) Faulty audio amplifier	Check interphone operation from interphone jack outlets. If not satisfactory, interchange audio amplifier with one known to be serviceable	Replace faulty audio amplifier

AUDIO INTEGRATING - MAINTENANCE PRACTICES

1. General

A. The radio communication systems, radio navigation systems, and the passenger address system must be operating to perform the entire audio integrating system test. If an audio integrating system component such as a headset or a microphone receptacle, is replaced, perform the audio integrating system test steps necessary to verify the operation of the component at the affected station. If an audio control panel is replaced, perform the entire test at the affected station. If a radio communication system or a radio navigation system component is replaced, perform the monitoring and isolation of radio receiver audio test for the affected system.

2. Adjustment/Test

A. Test Monitoring and Isolation of Radio Receiver Audio

	Operation	Station	Desired Result
(1)	Place audio control panel communication and navigation audio control knobs and switches to off.	Captain's First Officer's Flight Engineer's Navigator's	Isolation of all radio receiver audio.
(2)	Place audio control panel microphone selector switch to flight interphone.	Captain's First Officer's Flight Engineer's Navigator's	All stations on audio integrating communications.
(3)	Place audio control panel interphone volume control to mid-position.	Captain's First Officer's Flight Engineer's Navigator's	Monitoring of audio integrating amplifier.
(4)	Loudspeaker volume control to full CCW.	Captain's First Officer's Flight Engineer's Navigator's	Loudspeakers muted.
(5)	Select local channels on NAV-1, VHF-1, HF-1, HF-2, VHF-2, NAV-2, ADF-1, and ADF-2.	Respective selector panels	Audio output from all radio receivers.

	Operation	Station	Desired Result

NOTE: Employ headsets and boomsets to monitor receiver audio. While testing one station, monitor all other stations.

	Operation	Station	Desired Result
(6)	Move audio control panel audio control knob through full travel and place to off.	Captain's First Officer's Flight Engineer's Navigator's	Each system audio level varies smoothly with control knob travel and no audio is detected at any other station.
(7)	Place ADF-1 and ADF-2 selector switches to voice, range, both, and place to off.	Captain's First Officer's Flight Engineer's Navigator's	ADF-1 and ADF-2 audio is present in all positions.

B. Test Audio Integrating System Intercommunications

	Operation	Station	Desired Result
(1)	Place audio control panel communication and navigation audio control knobs and switches to off.	Captain's First Officer's Flight Engineer's Navigator's	Isolation of all radio receiver audio.
(2)	Place audio control control panel micro-phone selector switch to flight interphone.	Captain's First Officer's Flight Engineer's Navigator's	All stations on audio integrating communications.
(3)	Place audio control panel interphone volume control to mid-position.	Captain's First Officer's Flight Engineer's Navigator's	Monitoring of audio integrating amplifier.
(4)	Place microphone selector panel switch to boom normal.	Captain's First Officer's Flight Engineer's	Selection of boomset microphone.
(5)	Place loudspeaker volume control to full CCW.	Captain's First Officer's	Loudspeakers muted.

	Operation	Station	Desired Result

NOTE: The following steps check boomsets, amplifier jack outlets, switch control, interphone volume control, and loudspeaker volume control.

	Operation	Station	Desired Result
(6)	Employ boomsets. Press pendant switch push-button and speak into boomset microphone with normal tone while turning interphone volume control CW and CCW, then set to comfortable level.	Captain's First Officer's Flight Engineer's	Boomset audio varies smoothly, clearly and distinctly with volume control.
(7)	While speaking into boomset, turn loudspeaker volume control CW and CCW, then set to a comfortable level.	Captain's First Officer's	Associated loudspeaker is muted. Other loudspeaker varies smoothly with volume control.
(8)	Release pendant switch push-button.	Captain's First Officer's Flight Engineer's	End pendant switch control check.
(9)	Press control wheel push-to-talk switch and speak into boomset with normal tone.	Captain's First Officer's	Associated station loudspeaker is muted. Boomset and other loudspeaker respond to microphone audio.
(10)	Release control wheel push-to-talk switch.	Captain's First Officer's	End control wheel switch control check.
(11)	Turn loudspeaker volume control to full CCW.	Captain's First Officer's	Loudspeakers muted.

NOTE: The following steps check oxygen mask microphones, microphone selector panels and audio on boomsets and headsets.

	Operation	Station	Desired Result
(12)	Place microphone selector panel switch to mask normal.	Captain's First Officer's Flight Engineer's	Selection of oxygen mask microphone.

	Operation	Station	Desired Result
(13)	Employ oxygen mask microphone. Press any push-to-talk switch and speak into microphone with normal tone.	Captain's First Officer's Flight Engineer's	Headsets and boomsets respond to microphone audio, clearly and distinctly.
(14)	Place microphone selector panel to PA and pull to lock in place.	Captain's First Officer's Flight Engineer's	Cabin loudspeakers respond to microphone audio.
(15)	Release push-to-talk switch and place microphone selector panel switch to boom normal.	Captain's First Officer's Flight Engineer's	End oxygen mask microphone check.
(16)	Press oxygen mask microphone push-to-talk switch and speak into microphone with normal tone. Turn navigator's audio control panel interphone volume switch CCW and CW.	Navigator's	Headsets respond to microphone audio, clearly and distinctly, and audio varies with volume control travel.
(17)	Release push-to-talk switch.	Navigator's	End oxygen mask microphone check.

NOTE: The following steps check hand microphone, and audio on headset.

	Operation	Station	Desired Result
(18)	Employ hand microphone, press push-to-talk switch, and speak into microphone with normal tone.	Navigator's	Headset responds to microphone audio, clearly and distinctly.
(19)	Release push-to-talk switch.	Navigator's	End hand microphone check.

	Operation	Station	Desired Result

NOTE: The following steps check microphone selector panel pendant switch receptacle audio and headset jack outlets.

	Operation	Station	Desired Result
(20)	Disconnect hand microphone from receptacle.	Navigator's	Employ hand microphone at other stations.
(21)	Disconnect pendant switch and connect hand microphone.	Captain's First Officer's Flight Engineer's	Check pendant switch receptacle audio input.
(22)	Remove headset from jack outlet.	Navigator's	
(23)	Install headset jack into jack outlet.	Captain's First Officer's Flight Engineer's	Headset responds to microphone audio, clearly and distinctly.
(24)	Employ hand microphone, press push-to-talk switch, and speak into microphone with normal tone.	Captain's First Officer's Flight Engineer's	Headset responds to microphone audio, clearly and distinctly.
(25)	Release push-to-talk switch.	Captain's First Officer's Flight Engineer's	End jack outlet check.
(26)	Disconnect hand microphone and connect pendant switch.	Captain's First Officer's Flight Engineer's	
(27)	Connect hand microphone to receptacle.	Navigator's	
(28)	Remove headset from jack outlet and install in navigator's station jack outlet.	Captain's First Officer's Flight Engineer's	

NOTE: The following steps check operation of handset station.

	Operation	Station	Desired Result
(29)	Insert handset into jack outlet.	Nose wheel well	Relay energized.

	Operation	Station	Desired Result
(30)	Employ handset, press push-to-talk switch, and speak into microphone with normal tone.	Nose wheel well	Handset responds to microphone audio, clearly and distinctly.
(31)	Release push-to-talk switch and remove handset from jack outlet.	Nose wheel well	End nose wheel well station check.

AUDIO INTEGRATING - MAINTENANCE PRACTICES

1. General

A. The radio communication systems, radio navigation systems, and the passenger address system must be operating to perform the entire audio integrating system test. If an audio integrating system component, such as a headset or a microphone jack panel, is replaced, perform the test steps necessary to verify the operation of the component at the affected station. If an audio control panel is replaced, perform the entire test at the affected station. If a radio communication system or a radio navigation system component is replaced, perform the monitoring and isolation of radio receiver audio test for the affected system.

2. Adjustment/Test

A. Test Audio Integrating System Interphone

	Operation	Station/Location	Desired Results
(1)	Place audio control panel radio receiver audio control knobs and switches in off.	Captain's First Officer's Engineer's Navigator's	Isolation of radio receiver audio.
(2)	Place passenger address emergency announce switch in off.	Aft pedestal	Selection of audio integrating amplifier.
(3)	Press interphone microphone selector switch.	Captain's First Officer's Engineer's Navigator's	Microphone output routed to audio integrating amplifier.
(4)	Place interphone audio control knob in forward position.	Captain's First Officer's Engineer's Navigator's	Monitoring of audio integrating amplifier outputs.
(5)	Place loudspeaker volume controls in CCW.	Captain's First Officer's	Loudspeakers muted.
(6)	Place filter switch in off.	Captain's First Officer's Engineer's Navigator's	Bypass filter.

NOTE: Steps (7) through (11) check boomsets, loudspeakers, and associated audio integrating system controls.

	Operation	Station/Location	Desired Results
(7)	Employ boomsets, and place control wheel switches in interphone.	Captain's First Officer's	Boom microphone output routed to audio integrating amplifier.
(8)	Speak into microphone with normal tone. Move interphone audio control knob back and forth, and then set at comfortable level.	Captain's First Officer's	Microphone audio is clear and distinct and varies smoothly with audio control knob travel.
(9)	Speak into microphone at navigator's station and rotate loudspeaker volume control CW and CCW, and then set to full CCW.	Captain's First Officer's	Loudspeaker volume varies smoothly with volume control rotation.
(10)	Place control wheel switch in radio, and speak into microphone with normal tone.	Captain's First Officer's	Microphone audio is clear and distinct.
(11)	Release control wheel switch.	Captain's First Officer's	

NOTE: Steps (12) through (15) check hand microphones, headsets, and associated audio integrating system controls. The headsets are connected in parallel and the hand microphones are connected in parallel at the navigator's station and the observer's station.

	Operation	Station/Location	Desired Results
(12)	Employing hand microphone and headset, press push-to-talk switch and speak into microphone with normal tone.	Captain's First Officer's Navigator's Engineer's Observer's	Microphone outputs routed to audio integrating amplifier.
(13)	Move interphone audio control knob back and forth, then set to comfortable level.	Engineer's Navigator's	Microphone audio is clear and distinct and varies smoothly with audio control.

	Operation	Station/Location	Desired Results
(14)	Place filter switch in on and speak into microphone with normal tone.	Captain's First Officer's Engineer's Observer's	Background noise is inaudible.
(15)	Release push-to-talk switch.	Captain's First Officer's Engineer's Navigator's	

NOTE: Steps (16) through (20) check oxygen mask microphones and associated audio integrating system controls.

	Operation	Station/Location	Desired Results
(16)	Employing oxygen mask microphone and headset, place control wheel switch to interphone.	Captain's First Officer's	Route microphone outputs to audio integrating amplifier.
(17)	Speak into microphone with normal tone.	Captain's First Officer's	Microphone audio is clear and distinct.
(18)	Release control wheel switch.	Captain's First Officer's	End oxygen mask microphone check.
(19)	Employing oxygen mask microphone and headset, depress push-to-talk switch.	Engineer's Navigator's	Microphone outputs routed to audio integrating amplifier.
(20)	Speak into microphone with normal tone.	Engineer's Navigator's	Microphone audio is clear and distinct.
(21)	Release push-to-talk switch.	Engineer's Navigator's	

B. Test Monitoring of Radio Receiver Audio and Isolation of Stations

	Operation	Station/Location	Desired Results
(1)	Place audio control panel radio receiver audio control knobs and switches in off.	Captain's First Officer's Engineer's Navigator's	Isolation of radio receiver audio

	Operation	Station/Location	Desired Results
(2)	Depress interphone microphone selector switch.	Captain's First Officer's Engineer's Navigator's	Any interference routed to audio integrating amplifier.
(3)	Place interphone audio control knob in mid-position.	Captain's First Officer's Engineer's Navigator's	Monitoring of audio integrating amplifier.
(4)	Place loudspeaker volume control in full CCW.	Captain's Flight Officer's Engineer's Navigator's	Loudspeaker musted.
(5)	Select local channels on VHF-1, VHF-2, HF-1, HF-2, VHF/NAV-1, VHF/NAV-2, ADF-1, and ADF-2.	Respective selector panels	Audio output from all audio receivers.

NOTE: Employ headset to monitor radio receiver audio. While testing the monitoring at one station, monitor at least one other station to verify isolation.

	Operation	Station/Location	Desired Results
(6)	Move each audio control panel audio control knob forward and then to off.	Captain's First Officer's Engineer's Navigator's	Each system audio varies smoothly with audio control knob travel and audio is not detected at any other station.
(7)	Place ADF-1 and ADF-2 switches in on and then in off.	Captain's First Officer's Engineer's Navigator's	Each receiver audio is present.

AUDIO INTEGRATING - MAINTENANCE PRACTICES

1. General

A. The radio communication systems, radio navigation systems, and the passenger address system must be operating to perform the entire audio integrating system test. If an audio integrating system component, such as a headset of a microphone is replaced, perform the test steps necessary to verify the operation of the component at the affected station. If an audio control panel is replaced the entire test should be performed at the affected station. If a radio system component is replaced, the monitoring and isolation of radio receiver audio section of the test should be performed.

2. Adjustment/Test Audio Integrating

A. Test Audio Integrating Interphone

	Operation	Station/Location	Desired Result
(1)	Place audio control panel audio selector switches in down position.	Captain's First Officer's Engineer's Navigator's	Isolation of radio receiver audio.
(2)	Place audio control panel microphone selector switch in normal interphone position.	Captain's First officer's Engineer's Navigator's	Microphone output directed to audio amplifier.
(3)	Place loudspeaker volume control CCW.	Captain's First Officer's	Mute loudspeakers
(4)	Employ hand microphone and headset. Press push-to-talk switch and speak into microphone with normal tone. Rotate audio control knob CW and CCW.	Captain's First officer's Engineer's Navigator's	Microphone audio is clear and distinct and varies smoothly with volume control rotation.

	Operation	Station/Location	Desired Result
(5)	Employ oxygen mask microphones and headsets. Press control wheel microphone control switch and speak into microphone with normal tone.	Captain's First officer's	Microphone audio is clear and distinct.
(6)	Place audio control panel microphone selector switch in emergency interphone position. Speak into microphone with normal tone.	Captain's First officer's	Microphone audio is clear and distinct.
(7)	Employ oxygen mask microphone and headset. Press integral push-to-talk switch and speak into microphone with normal tone.	Engineer's Navigator's	Microphone audio is clear and distinct.
(8)	Place microphone selector switch in normal interphone position, and place passenger address/normal switch in passenger address position.	Captain's First officer's Engineer's Navigator's	Transfer oxygen mask microphone to passenger address system.
(9)	Employ oxygen mask microphone and headset. Press microphone push-to-talk switch and speak into microphone with normal tone.	Captain's First officer's Engineer's Navigator's	Passenger address sidetone is clear and distinct.
(10)	Place passenger address/normal switch in normal position.	Captain's First officer's Engineer's Navigator's	

B. Test Audio Integrating Loudspeakers

	Operation	Station/Location	Desired Result
(1)	Employ hand microphone and press push-to-talk switch. Speak into microphone with normal tone.	Engineer's or Navigator's	Monitoring of audio amplifier outputs on loudspeakers.
(2)	Rotate loudspeaker volume control CW and CCW, then set to comfortable level.	Captain's First officer's	Microphone audio is clear and distinct and varies smoothly with volume control rotation.
(3)	Press control wheel microphone control switch.	Captain's First officer's	Loudspeakers muted
(4)	Place passenger address/normal switch in passenger address position and press respective station microphone control switch.	Captain's First officer's Engineer's Navigator's	Loudspeakers muted
(5)	Place passenger address/normal switch in normal position.	Captain's First officer's Engineer's Navigator's	Loudspeakers respond to microphone audio.

C. Test Monitoring and Isolation of Radio Receiver Audio

NOTE: Monitor audio on headset. While testing one station, monitor one other station to verify isolation.

	Operation	Station/Location	Desired Result
(1)	Select local channels on communication and navigation radio receivers.	Respective selector control panels.	Audio output from all receivers.
(2)	Place interphone audio selector switch in up position.	Captain's First officer's Engineer's Navigator's	Provide common signal tie to verify Isolation.

	Operation	Station/Location	Desired Result
(3)	At each station in succession, place each radio receiver audio selector switch in up position and then in down position	Captain's First officer's Navigator's Engineer's	Radio receiver audio is present at station being tested and audio is not detected at other station to verify isolation.
(4)	Place interphone mixing switch to up position and place microphone selector switch in interphone position.	Captain's First officer's Engineer's Navigator's	Check interphone mixing.
(5)	Place a radio receiver audio selector switch in up position.	Captain's First officer's Engineer's Navigator's	Radio receiver audio is present.

AUDIO INTEGRATING - MAINTENANCE PRACTICES

1. General

A. The radio communications systems, radio navigation systems, and all radio receivers must be operating to perform the entire audio integrating system test. If an audio integrating system component, such as a headset or a microphone selector switch, is replaced, perform the test steps necessary to verify the operation of the component at the affected station. If an audio control panel is replaced perform the entire test at the affected station. If a radio transceiver or receiver is replaced, perform the monitoring and isolation test for the affected system.

2. Adjustment/Test

A. Test Audio Integrating System Interphone

	Operation	Station/Location	Desired Results
(1)	Place audio control panel microphone selector to interphone, interphone audio switch up, and emergency/normal switch to normal.	Captain's First Officer's Engineer's Observer's	
(2)	Place gusset panel microphone selector switch to off position.	Captain's First Officer's	Remove microphone input from selector switches.
(3)	Use hand microphones and headsets to communicate. Vary each volume control.	Captain's First Officer's Engineer's Observer's	Audio is clear, distinct, and varies smoothly with volume control.
(4)	Place audio control panel speaker switches up.	Captain's First Officer's	Headsets should be inoperative. Respective speaker muted when captain's or first officer's microphone is used.

	Operation	Station/Location	Desired Results
(5)	Use smoke mask microphones and place gusset mic selectors to smoke mic position. Communicate with all stations.	Captain's First Officer's Engineer's Observer's	Respective speaker muted when control wheel push-to-talk switches are used. Audio is clear and distinct.
(6)	Place audio control panel speaker switches down.	Captain's First Officer's	Speakers are disconnected.
(7)	Use boom microphones with headsets and place gusset mic selectors to boom mic position. Communicate with all stations.	Captain's First Officer's Engineer's Observer's	Audio is clear and distinct.
(8)	Use oxygen microphones with headsets and place gusset mic selectors to oxygen mic position. Communicate with all stations.	Captain's First Officer's Engineer's Observer's	Audio is clear and distinct.
(9)	Place audio control panel normal/emergency switch to emergency position. Communicate with all stations.	Captain's First Officer's Engineer's Observer's	Audio is clear and distinct.
(10)	Place audio control panel marker beacon switches up.	Captain's First Officer's Engineer's Observer's	Applicable intercommunication system should be isolated from all other stations.
(11)	Place audio control panel marker beacon switches down.	Captain's First Officer's Engineer's Observer's	All station's on interphone.

	Operation	Station/Location	Desired Results
(12)	Place audio control panel normal/emergency switch to normal position.	Captain's First Officer's Engineer's Observer's	Return system to normal operation.
(13)	Place audio control panel interphone audio switch in down position and microphone selector switch to HF-1 position.	Captain's	When communicating between all other stations captain's audio is isolated from all other stations.
(14)	Place audio control panel interphone audio switch in up position and microphone selector switch to interphone position.	Captain's	Return captain's station to interphone operation.
(15)	Repeat step A (13).	First Officer's Engineer's Observer's	When communicating between all other stations applicable station audio is isolated from all other stations.

B. Test Monitor of Communication Transceivers and Navigation Receivers.

	Operation	Station/Location	Desired Results
(1)	Place audio control panel microphone selector and audio select switches to noted positions. VHF-1 - VHF COMM-1 VHF-2 - VHF COMM-2 HF-1 - HF-1 HF-2 - HF-2	Captain's First Officer's Engineer's Observer's	To allow operation of applicable transceiver.
(2)	At noted positions in step B. (1) press push-to-talk button on hand microphones.	Captain's First Officer's Engineer's Observer's	Audio sidetone output from selected transceiver.

Operation	Station/Location	Desired Results
(3) Place all radio selector audio switches up, at audio control panel, one at a time.	Captain's First Officer's Engineer's Observer's	Audio is present at each switch position from an operating transmitter.

AUDIO INTEGRATING - MAINTENANCE PRACTICES

1. General

A. The radio communications systems, radio navigation systems, and all radio receivers must be operating to perform the entire audio integrating test. If an audio integrating system component, such as a headset or a microphone is replaced, perform the test steps necessary to verify the operation of the component at the affected station. If an audio control panel is replaced perform the entire test at the affected station. If a radio transceiver or receiver is replaced, perform the monitoring and isolation test for the affected system.

2. Adjustment/Test

A. Test Audio Integrating System Interphone

Operation	Station/Location	Desired Results
(1) Depress audio control panel interphone pushbutton, place interphone audio switch up, and audio volume to midposition.	Captain's First Officer's	
(2) Place speaker volume control to midposition.	Captain's First Officer's	
(3) Place audio selector switch to captain's position.	Engineer's	Engineer's headset connected to captain's headset audio.
(4) Use hand microphone and headset to communicate with noted stations.	Captain's First Officer's Engineer's	Speakers muted when captain's or first officer's microphone is used. Audio is clear and distinct.
(5) Vary volume control at audio panel.	Captain's	Captain's and engineer's audio varies smoothly with volume control.
(6) Vary volume control at audio panel.	First Officer's	First officer's audio varies smoothly with volume control.

	Operation	Station/Location	Desired Results
(7)	Use oxygen microphone and headset to communicate.	Captain's First Officer's Engineer's Observer's	Audio is clear and distinct.
(8)	Use boomset, control wheel and then audio control panel push-to-talk switch to communicate.	Captain's First Officer's	Speakers muted when control wheel or audio control panel push-to-talk switch is used.
(9)	Use oxygen microphone and headset to communicate and vary speaker volume.	Engineer's Observer's	Captain's or first officer's speaker audio should vary smoothly with applicable volume control.

B. Test Monitor of Communication Transceivers and Navigation Receivers

	Operation	Station/Location	Desired Results
(1)	Place audio selector switch to first officer's position.	Engineer's	Engineer's headset connected to first officer's headset.
(2)	Depress audio control panel microphone pushbutton and audio selector switch to noted positions VHF-1, VHF-2, and VHF-3.	Captain's First Officer's	To allow operation of applicable transceiver.
(3)	At noted positions in step B.(2) press push-to-talk button on hand microphone.	Captain's First Officer's	Audio sidetone output from selected transceiver. Audio at engineer's headset should be same as first officer's audio.
(4)	Place all radio selector audio switches up, at audio control panel, one at a time.	Captain's First Officer's	Audio is present at each switch position from an operating transmitter.

AUDIO INTEGRATING - MAINTENANCE PRACTICES

1. General

A. The radio communications systems, radio navigation systems, and all radio receivers must be operating to perform the entire audio integrating system test. If an audio integrating system component, such as a headset, is replaced, perform the test steps necessary to verify the operation of the component at the affected station. If an audio control panel is replaced perform the entire test at the effected station. If a radio transmitter, receiver, or transceiver is replaced, perform the monitoring and isolation test for the affected system.

2. Adjustment/Test

A. Test Audio Integrating System Interphone

Operation	Station/Location	Desired Results
(1) Press audio control panel microphone selector interphone pushbutton. Place interphone audio switch up, and emergency switch down.	Captain's First Officer's Engineer's Navigator's	
(2) Use hand microphones and headsets to communicate. Vary each volume control.	Captain's First Officer's Engineer's Navigator's	Audio is clear, distinct, and varies smoothly with volume control.
(3) Use flight engineer panel selector switch to select captain's and first officer's interphone audio.	Engineer's	Audio is clear, distinct, and is received from both stations.

NOTE: The observer's intercommunication equipment operates in parallel with navigator's through navigator's control panel.

Operation	Station/Location	Desired Results
(4) Use hand held microphone, communicate with all stations.	Captain's First Officer's	Respective speaker muted when captain's or first officer's microphone is used.

	Operation	Station/Location	Desired Results
(5)	Use mask microphones, communicate with all stations.	Captain's First Officer's	Respective speaker muted when control wheel push-to-talk switches are used. Audio is clear and distinct.
(6)	Place audio control panel emergency switch to emergency position. Communicate with all stations.	Captain's First Officer's Navigator's	Audio is clear and distinct.
(7)	Place audio control panel marker beacon switches up.	Captain's First Officer's Navigator's	Applicable station intercommunication system should be isolated from all other stations.
(8)	Place audio control panel marker beacon switches down.	Captain's First Officer's Navigator's	All stations on interphone.
(9)	Place audio control panel normal/emergency switch to down position.	Captain's First Officer's Navigator's	Return system to normal operation.
(10)	Place audio control panel interphone audio switch in down position and press HF-1 microphone selector switch to HF-1 position.	Captain's	When communicating between all other stations captain's audio is isolated from all other stations.
(11)	Place audio control panel interphone audio switch in up position and press interphone microphone selector switch to interphone position.	Captain's	Return captain's station to interphone operation.
(12)	Repeat step A (10).	First Officer's Navigator's	When communicating between all other stations applicable station audio is isolated from all other stations.

B. Test Audio Integrating System Radio

	Operation	Station/Location	Desired Results
(1)	Place audio control panel HF and VHF audio select switches up.	Captain's First Officer's Navigator's	To allow operation of applicable radio system.
(2)	In sequence, press audio control panel microphone select pushbuttons: At each selected position, press microphone push-to-talk button on hand microphones.	Captain's First Officer's Navigator's	Audio sidetone output from selected transmitter.
(3)	Place all radio selector audio switches up, at audio control panel, one at a time.	Captain's First Officer's Navigator's	Audio is present at each switch position from an operating transmitter.

AUDIO INTEGRATING - MAINTENANCE PRACTICES

1. General

A. The radio communications system, radio navigation systems, and all other radio receivers must be operating to perform the entire audio integrating system test. If an audio integrating component, such as a headset is replaced, perform the test steps necessary to verify operation of the component at the affected station. If a radio transmitter, receiver, or transceiver is replaced, perform the monitoring test for the affected system.

2. Adjustment/Test

A. Test Audio Integrating System Interphone

Operation	Station/Location	Desired Results
(1) Press audio control panel interphone selector switch: Place interphone volume control to midposition.	Captain's First Officer's Navigator's	
(2) Use hand microphones to communicate. Vary each volume control.	Captain's First Officer's Navigator's	Audio is clear and distinct and varies smoothly with rotation of volume control.

NOTE: The observer's headset operates in parallel with captain's headset through the captain's control panel. The flight engineer's headset operates in parallel with the navigator's through the navigator's control panel.

Operation	Station/Location	Desired Results
(3) Use hand microphones, transmit from each station.	Captain's First Officer's Navigator's Flight Engineer's	Interphone sidetone present in headset as each station transmits.
(4) Place headsets in alternate headset jacks: Use hand microphones and transmit from each station.	Captain's First Officer's Flight Engineer's Navigator's	Audio clear and distinct at all stations.

NOTE: Captain's audio is heard in the first officer's and flight engineer's alternate headset. First officer's audio is heard in the captain's, observer's, and navigators alternate headset.

	Operation	Station/Location	Desired Results
(5)	Place audio control panel speaker volume in midposition; communicate with all stations.	Captain's First Officer's	Respective speaker muted when microphone push-to-talk switch is pressed. Audio is clear and distinct.
(6)	Place audio control panel speaker volume control to off.	Captain's First Officer's	Speakers are disconnected.
(7)	Use boom microphones with headsets and control wheel push-to-talk switches, communicate with all stations.	Captain's First Officer's	Audio is clear and distinct.

B. Test Monitor of Communication Transmitters and Receivers and Navigation Receivers

	Operation	Station/Location	Desired Results
(1)	Place audio control panel volume controls for HF-1, HF-2, VHF-1 and VHF-2 to midposition.	Captain's First Officer's Navigator's	To allow operation of applicable transmitter of receiver.
(2)	In sequence, press transmitter select switches: At each station operate microphone push-to-talk switches.	Captain's First Officer's Navigator's	Sidetone audio is present from selected transmitter.
(3)	Monitor an operating transmitter for each communication system; Vary volume control for each system.	Captain's First Officer's Navigator's	Audio is clear and distinct and varies smoothly as volume control is rotated.
(4)	In sequence, operate all navigation receiver volume controls and selectors switches.	Captain's First Officer's Navigator's	Audio is present through each switch position from an operating transmitter.

AUDIO INTEGRATING - MAINTENANCE PRACTICES

1. General

A. The radio communications systems, radio navigation systems, and all radio receivers must be operating to perform the entire audio integrating system test. If an audio integrating system component, such as a headset or a microphone switch, is replaced, perform the test steps necessary to verify the operation of the component at the affected station. If an audio control panel is replaced perform the entire test at the affected station. If a radio transceiver or receiver is replaced, perform the monitoring and isolation test for the affected system.

2. Adjustment/Test

A. Test Audio Integrating System Interphone

	Operation	Station/Location	Desired Results
(1)	Place interphone switch to cockpit position.	Flight compartment overhead switch panel.	Flight interphone operation.
(2)	Place flight engineer's audio select switch to normal position.	Flight engineer's panel.	To monitor normal audio.
(3)	Place audio control panel microphone selector to interphone, interphone audio switch up, and emergency switch down.	Captain's First Officer's Engineer's Observer's	
(4)	Use hand microphones and headsets to communicate. Vary each volume control.	Captain's First Officer's Engineer's Observer's	Audio is clear, distinct, and varies smoothly with volume control.
(5)	Place speaker volume control to midposition.	Captain's. First Officer's	Respective speaker muted when captain's or first officer's microphone is used.

	Operation	Station/Location	Desired Results
(6)	Use oxygen mask microphones and communicate with all stations.	Captain's First Officer's Engineer's Observer's	Respective speaker muted when control wheel interphone push-to-talk switches are used. Audio is clear and distinct.
(7)	Adjust speaker audio volume control counterclockwise then clockwise.	Captain's First Officer's	Applicable speaker is off when control is in counterclockwise position.
(8)	Place audio control panel emergency switch to emergency position. Communicate with all stations.	Captain's First Officer's Engineer's Observer's	Audio is clear and distinct.
(9)	Place audio control panel ATC switch up.	Captain's First Officer's Engineer's Observer's	Applicable intercommunication system should be isolated from all other stations.
(10)	Place audio control panel ATC switch down.	Captain's First Officer's Engineer's Observer's	All stations on interphone.
(11)	Place audio control panel emergency switch to down position.	Captain's First Officer's Engineer's Observer's	Return system to normal operation.
(12)	Place audio control panel interphone audio switch in down position and microphone selector switch to HF-1 position.	Captain's	When communicating between all other stations captain's audio is isolated from all other stations.
(13)	Place audio control panel interphone audio switch in up position and microphone selector switch to interphone position.	Captain's	Return captain's station to interphone operation.

	Operation	Station/Location	Desired Results
(14)	Repeat step A (12).	First Officer's Engineer's Observer's	When communicating between all other stations applicable station audio is isolated from all other stations.

NOTE: Step A. (15) not applicable for Airplanes N1303-N1307.

	Operation	Station/Location	Desired Results
(15)	Use hand microphone, headset, and handsets to communicate.	Captain's Forward Attendant Aft Attendant	Flight interphone audio should be discernible and free from distortion.

B. Test Monitor of Communication Transceivers and Navigation Receivers

	Operation	Station/Location	Desired Results
(1)	Place audio control panel microphone selector and audio select switches to noted positions. VHF-1, VHF-2, HF-1, HF-2, and PA.	Captain's First Officer's Engineer's Observer's	To allow operation of applicable transceiver or passenger address amplifier.
(2)	At noted positions in step B.(1) press push-to-talk button on hand microphones.	Captain's First Officer's Engineer's Observer's	Audio sidetone output from selected transceiver or passenger address amplifier.
(3)	At one position in step B.(1) use oxygen mask microphones.	Captain's First Officer's	Respective speaker muted when control wheel radio push-to-talk switches are used.
(4)	At one position in step B.(1) use oxygen mask microphones.	Engineer's Observer's	Audio sidetone is clear and distinct when engineer's and observer's push-to-talk switches are used.

	Operation	Station/Location	Desired Results
(5)	Place all radio selector audio switches up at audio control panel, one at a time.	Captain's First Officer's Engineer's Observer's	Audio is present at each switch position from an operating transmitter.

AUDIO INTEGRATING - MAINTENANCE PRACTICES

1. General

A. The radio communications systems, radio navigation systems, and all radio receivers must be operating to perform the entire audio integrating system test. If an audio integrating system component, such as a headset or a microphone switch, is replaced, perform the test steps necessary to verify the operation of the component at the affected station. If an audio control panel is replaced perform the entire test at the affected station. If a radio transceiver or receiver is replaced, perform the monitoring and isolation test for the affected system.

2. Adjustment/Test

A. Test Audio Integrating System Interphone

	Operation	Station/Location	Desired Results
(1)	Place audio control panel microphone selector to interphone, interphone audio switch up, and emergency switch to down.	Captain's First Officer's Navigator's	
(2)	Use hand microphones and headsets to communicate. Vary each volume control.	Captain's First Officer's Navigator's	Audio is clear, distinct, and varies smoothly with volume control.

NOTE: The observer's intercommunication equipment operates in parallel with navigator's through navigator's control panel. Captain's or first officer's audio is selectable through a switch at engineer's station.

	Operation	Station/Location	Desired Results
(3)	Place speaker volume control to midposition.	Captain's First Officer's	Respective speaker muted when captain's or first officer's microphone is used.

	Operation	Station/Location	Desired Results
(4)	Use mask microphones and communicate with all stations.	Captain's First Officer's Navigator's	Respective speaker muted with control wheel push-to-talk switches are used. Audio is clear and distinct.
(5)	Adjust speaker volume control counterclockwise then clockwise.	Captain's First Officer's	Applicable speaker is off when control is in counterclock-wise position.
(6)	Place audio control panel emergency switch to up position. Communicate with all stations.	Captain's First Officer's Navigator's	Audio is clear and distinct.
(7)	Place audio control panel marker beacon switches up.	Captain's First Officer's Navigator's	Applicable inter-communication system should be isolated from all other stations.
(8)	Place audio control panel marker beacon switches down.	Captain's First Officer's Navigator's	All stations on interphone.
(9)	Place audio control panel emergency switch to down position.	Captain's First Officer's Navigator's	Return system to normal operation.
(10)	Place audio control panel interphone audio switch in down position and micro-phone selector switch to HF-1 position.	Captain's	When communicating between all other stations captain's audio is isolated from all other stations.
(11)	Place audio control panel interphone audio switch in up position and microphone selector switch to interphone position.	Captain's	Return captain's station to inter-phone operation.

	Operation	Station/Location	Desired Results
(12)	Repeat steps A (10) and (11).	First Officer's Navigator's	When communicating between all other stations applicable station audio is isolated from all other stations.

B. Test Monitor of Communication Transceivers and Navigation Receivers

(1)	Place audio control panel microphone selector and audio select switches to noted positions. VHF-1 VHF-2 HF-1 HF-2	Captain's First Officer's Navigator's	To allow operation of applicable transceiver.
(2)	At noted positions in step B.(1) press push-to-talk button on hand microphones.	Captain's First Officer's Navigator's	Audio sidetone output from selected transceiver.
(3)	Place all radio selector audio switches up, at audio control panel, one at a time.	Captain's First Officer's Navigator's	Audio is present at each switch position from an operating transmitter.

AUDIO INTEGRATING - MAINTENANCE PRACTICES

1. General

A. The radio communication systems and radio navigation systems must be operating to perform the entire audio integrating system test. If an audio integrating system component, such as a headset or a microphone jack panel, is replaced, perform the test steps necessary to verify the operation of the component at the affected station. If an audio control panel is replaced, perform the entire test at the affected station. If a radio communication system or a radio navigation system component is replaced, perform the monitoring and isolation of radio receiver audio test for the affected system.

2. Adjustment/Test

A. Test Audio Integrating System Interphone

Operation	Station/Location	Desired Results
(1) Place audio control panel radio receiver audio switches in off.	Captain's First Officer's Navigators	Isolation of radio receiver audio.
(2) Press interphone microphone selector switch.	Captain's First Officer's Navigator's	Microphone output routed to flight interphone amplifier.
(3) Place interphone audio switch in up position.	Captain's First Officer's Navigator's	Monitoring of flight interphone amplifier outputs.
(4) Place audio control panel volume control in midposition.	Captain's First Officer's	Ensures adequate audio output level.
(5) Place loudspeaker switch on.	Captain's First Officer's	Connect audio output to loudspeakers.
(6) Place speaker amplifier switch to on.	Captain's First Officer's	Enable speaker operation.

NOTE: Steps (7) through (12) check boomsets, loudspeakers, and associated audio integrating system controls.

	Operation	Station/Location	Desired Results
(7)	Position boom/mask microphone switch to boom.	Captain's First Officer's	Boom microphone connected to audio integrating system.
(8)	Place control wheel switches in interphone.	Captain's First Officer's	Boom microphone output routed to flight interphone amplifier.
(9)	Employ boomsets, speak into microphone with normal tone. Move volume control CW and CCW and then set at comfortable level.	Captain's First Officer's	Microphone audio is clear and distinct at headsets and varies smoothly with control travel. Respective loudspeakers are muted.
(10)	Position audio control panel radio/interphone switch to interphone; speak into microphone and vary volume control CW and CCW then set to confortable level.	Navigator's	Captain's and First Officer's loudspeaker volume varies smoothly with volume control rotation.
(11)	Place flight engineer's microphone selector switch to boom and speak into microphone.	Captain's First Officer's Navigator's	Microphone audio is clear and distinct.
(12)	Place audio control panel radio/interphone selector switch in interphone and speak into microphone with normal tone.	Captain's First Officer's	Microphone audio is clear and distinct at headsets. Respective loudspeaker is muted.

NOTE: Steps (13) through (15) check the microphones, headsets, and associated audio integrating system controls.

	Operation	Station/Location	Desired Results
(13)	Employing hand microphone and headset, press push-to-talk switch and speak into microphone with normal tone.	Captain's First Officer's	Microphone outputs routed to flight interphone amplifier. Respective flight compartment loudspeaker muted.

Operation	Station/Location	Desired Results
(14) Employing hand microphone and headset, press push-to-talk switch and speak into microphone with normal tone.	Navigator's	Microphone output is routed to flight interphone amplifier. No speaker muting.
(15) In conjunction with steps (13) and (14), rotate volume control CW and CCW then set to a comfortable level.	Captain's First Officer's Navigator's	Audio is clear and distinct and varies smoothly with volume control rotation.

NOTE: Steps (16) through (21) check oxygen mask microphones and associated audio integrating system controls.

Operation	Station/Location	Desired Results
(16) Place boom/mask microphone switch to mask.	Captain's First Officer's Navigator's	Mask microphones connected to audio integrating system.
(17) Place control wheel switch to interphone.	Captain's First Officer's	Route microphone outputs to flight interphone amplifier.
(18) Employing oxygen mask microphone and headset, speak into microphone with normal tone.	Captain's First Officer's	Audio is clear and distinct. Speakers are not muted.
(19) Place radio/interphone selector switch to interphone.	Navigator's	Microphone output is routed to flight interphone amplifier.
(20) Employing oxygen mask microphone and headset, speak into microphone with normal tone.	Navigator's	Audio is clear and distinct.
(21) Place boom/radio/mask microphone selector switch to mask. Speak into microphone with normal tone.	Flight Engineer's	Microphone audio is routed to the flight interphone amplifier. Audio is clear and distinct.

B. Test Monitoring of Radio Receiver Audio

	Operation	Station/Location	Desired Results
(1)	Place audio control switches in off.	Captain's First Officer's Navigator's	Isolation of receiver audio.
(2)	Select local channels on VHF-1, VHF-2, VHF-3, HF-1, HF-2, NAV-1, NAV-2, ADF-1, ADF-2, and marker beacon.	Respective selector panels	Audio output from each selected channel.
(3)	Monitor alternate panels as each audio input is selected.	Audio panel not selected for radio input	No interference between flight stations from selected inputs.

AUDIO INTEGRATING - MAINTENANCE PRACTICES

1. General

A. The radio communications systems, radio navigation systems, and all radio receivers must be operating to perform the entire audio integrating system test. If an audio integrating system component, such as a headset or a microphone switch, is replaced, perform the test steps necessary to verify the operation of the component at the affected station. If an audio control panel is replaced perform the entire test at the affected station. If a radio transceiver or receiver is replaced, perform the monitoring and isolation test for the affected system.

2. Adjustment/Test

A. Test Audio Integrating System Interphone

	Operation	Station/Location	Desired Results
(1)	Place audio control panel microphone selector to interphone and normal/auxiliary switch to normal.	Captain's First Officer's Navigator's	
(2)	Use hand microphones and headsets to communicate. Vary each volume control.	Captain's First Officer's Navigator's	Audio is clear, distinct, and varies smoothly with volume control.

NOTE: The observer's intercommunication equipment operates in parallel with navigator's through navigator's control panel. Captain's or first officer's audio is selectable through a switch at engineer's station.

	Operation	Station/Location	Desired Results
(3)	Place audio control panel speaker switches up.	Captain's First Officer's	Respective speaker muted when captain's or first officer's microphone is used.

	Operation	Station/Location	Desired Results
(4)	Use mask microphones and communicate with all stations.	Captain's First Officer's Navigator's	Respective speaker muted when control wheel push-to-talk switches are used. Audio is clear and distinct.
(5)	Adjust speaker volume control counterclockwise then clockwise.	Captain's First Officer's	Applicable speaker is off when control is in counter-clockwise position.
(6)	Place audio control panel normal/auxiliary switch to auxiliary position. Communicate with all stations.	Captain's First Officer's Navigator's	Audio is clear and distinct.
(7)	Place audio control panel marker beacon switches up.	Captain's First Officer's Navigator's	Applicable inter-communication system should be isolated from all other stations.
(8)	Place audio control panel marker beacon switches down.	Captain's First Officer's Navigator's	All stations on interphone.
(9)	Place audio control panel normal/auxiliary switch to normal position.	Captain's First Officer's Navigator's	Return system to normal operation.

B. Test Monitor of Communication Transceivers and Navigation Receivers

	Operation	Station/Location	Desired Results
(1)	Place audio control panel microphone selector and audio select switches to noted positions. VHF-1 - VHF-1 VHF-2 - VHF-2 HF-1 - HF-1 HF-2 - HF-2	Captain's First Officer's Navigator's	To allow operation of applicable transceiver.

	Operation	Station/Location	Desired Results
(2)	At noted positions in step B. (1) press push-to-talk button on hand microphones.	Captain's First Officer's Navigator's	Audio sidetone output from selected transceiver.
(3)	Place all radio selector audio switches up, at audio control panel, one at a time.	Captain's First Officer's Navigator's	Audio is present at each switch position from an operating transmitter.

AUDIO INTEGRATING - MAINTENANCE PRACTICES

1. General

A. The radio communication system, radio navigation systems, and all other radio receivers must be operating to perform the entire audio integration system test. If an audio integrating component, such as a headset is replaced, perform the test steps necessary to verify operation of the component at the affected station. If a radio transmitter, receiver, or transceiver is replaced, perform the monitoring test for the affected system.

2. Adjustment/Test

A. Test Audio Integrating System Interphone

Operation	Station/Location	Desired Results
(1) Press audio control panel interphone selector switch: place interphone volume control to midposition.	Captain's First Officer's Navigator's Flight Engineer's	
(2) Use hand microphones to communicate. Vary each volume control.	Captain's First Officer's Navigator's	Audio is clear and distinct and varies smoothly with rotation of volume control.

NOTE: The observers headset operates in parallel with captain's headset through the captain's control panel. The flight engineer's headset operates in parallel with the navigator's through the navigator's control panel.

Operation	Station/Location	Desired Results
(3) Use hand microphones, transmit from each station.	Captain's First Officer's Navigator's Flight Engineer's	Interphone side-tone present in headset as each station transmits.

	Operation	Station/Location	Desired Results
(4)	Place headsets in alternate headset jacks; use hand microphones and transmit from each station.	Captain's First Officer's Flight Engineer's Navigator's	Audio clear and distinct at all stations.

NOTE: Captain's audio is heard in the first officer's and flight engineer's alternate headset. First officer's audio is heard in the captain's, observer's, and navigator's alternate headset.

	Operation	Station/Location	Desired Results
(5)	Place audio control panel speaker volume in mid-position: communicate with all stations.	Captain's First Officer's	Respective speaker muted when micro-phone push-to-talk switch is pressed. Audio is clear and distinct.
(6)	Place audio control panel speaker volume control to off.	Captain's First Officer's	Speakers are disconnected.
(7)	Use boom microphones with headsets and control wheel push-to-talk switches, communicate with all stations.	Captain's First Officer's	Audio is clear and distinct.

B. Test Monitor of Communication Transmitters and Receivers, and Navigation Receivers

	Operation	Station/Location	Desired Results
(1)	Place audio control panel volume controls for HF-1, HF-2, VHF-1 and VHF-2 to midposition.	Captain's First Officer's Navigator's Flight Engineer's	To allow operation of applicable transmitter of receiver.

	Operation	Station/Location	Desired Results
(2)	In sequence, press transmitter select switches; at each station operate microphone push-to-talk switches.	Captain's First Engineer's Navigator's Flight Engineer's	Sidetone audio is present from selected transmitter.
(3)	Monitor an operating transmitter for each communication system; vary volume control for each system.	Captain's First Officer's Navigator's Flight Engineer's	Audio is clear and distinct and varies smoothly as volume control is rotated.
(4)	In sequence, operate all navigation receiver volume controls and selector switches.	Captain's First Officer's Navigator's Flight Engineer's	Audio is present through each switch position from an operating transmitter.

AUDIO INTEGRATING - MAINTENANCE PRACTICES

1. General

A. The radio communications systems, radio navigation systems, and all radio receivers must be operating to perform the entire audio integrating system test. If an audio integrating system component, such as a headset is replaced, perform the test steps necessary to verify the operation of the component at the affected station. If an audio control panel is replaced perform the entire test at the affected station. If a radio transceiver or receiver is replaced, perform the monitoring and isolation test for the affected system.

2. Adjustment/Test

A. Test Audio Integrating System Interphone

Operation	Station/Location	Desired Results
(1) Place audio control panel microphone selector to interphone, interphone audio switch up, and emergency switch down.	Captain's First Officer's Navigator's	
(2) Use hand microphones and headsets to communicate. Vary each volume control.	Captain's First Officer's Navigator's	Audio is clear, distinct, and varies smoothly with volume control.
(3) Use flight engineer panel selector switch to select captain's and first officer's interphone audio.	Engineer's	Audio is clear, distinct, and is received from both stations
(4) Use hand held microphone, communicate with all stations.	Captain's First Officer's	Respective speaker muted when captain's or first officer's microphone is used.

	Operation	Station/Location	Desired Results
(5)	Use mask microphones: Communicate with all stations.	Captain's First Officer's Navigator's	Respective speaker muted when control wheel push-to-talk switches are used. Audio is clear and distinct.
(6)	Place audio control panel emergency switch to emergency position. Communicate with all stations.	Captain's First Officer's Navigator's	Audio is clear and distinct.
(7)	Place audio control panel marker beacon switch up.	Captain's First Officer's Navigator's	Applicable intercommunication system should be isolated from all other stations.
(8)	Place audio control panel marker beacon switches down.	Captain's First Officer's Navigator's	All station's on interphone.
(9)	Place audio control panel emergency switch to down position.	Captain's First Officer's Navigator's	Return system to normal operation.
(10)	Place audio control panel interphone audio switch in down position and press HF-1 microphone selector switch.	Captain's	When communicating between all other stations captain's audio is isolated from all other stations.
(11)	Place audio control panel interphone audio switch in up position and and press interphone microphone selector switch.	Captain's	Return captain's station to interphone operation.
(12)	Repeat step A (10).	First Officer's Navigator's	When communicating, between all other stations applicable station audio is isolated from all other stations.

D. Test Monitor of Communication Transceivers and Navigation Receivers.

	Operation	Station/Location	Desired Results
(1)	Place audio control panel microphone selector and audio select switches to noted positions. VHF-1, VHF-2, HF-1, HF-2.	Captain's First Officer's Navigator's	To allow operation of applicable transceiver.
(2)	At noted positions in step B. (1) press push-to-talk button on hand microphones.	Captain's First Officer's Navigator's	Audio sidetone output from selected transceiver.
(3)	Place all radio selector audio switches up, at audio control panel, one at a time.	Captain's First Officer's Navigator's	Audio is present at each switch position from an operating transmitter.

AUDIO INTEGRATING - MAINTENANCE PRACTICES

1. General

A. The radio communications systems, radio navigation systems, and all radio receivers must be operating to perform the entire audio integrating system test. If an audio integrating system component, such as a headset, is replaced, perform the test steps necessary to verify the operation of the component at the affected station. If an audio control panel is replaced perform the entire test at the affected station. If a radio transmitter, receiver, or transceiver is replaced, perform the monitoring and isolation test for the affected system.

2. Adjustment/Test

A. Test Audio Integrating System Interphone

	Operation	Station/Location	Desired Results
(1)	Place audio control panel microphone selector to flight interphone. Place flight interphone audio switch up, and emergency switch to normal.	Captain's First Officer's Navigator's	
(2)	Place flight/captain's audio/service selector switch to flight position.	Engineer's	
(3)	Use hand microphones and headsets to communicate. Vary each volume control	Captain's First Officer's Navigator's	Audio is clear, distinct, and varies smoothly with volume control

NOTE: The observer's intercommunication equipment operates in parallel with navigator's through navigator's control panel.

	Operation	Station/Location	Desired Results
(4)	Use hand held microphone, communicate between stations	Captain's First Officer's	Respective speaker muted when captain's or first officer's microphone is used

	Operation	Station/Location	Desired Results
(5)	Use mask microphones, communicate between stations	Captain's First Officer's	Respective speaker muted when control wheel push-to-talk switches are used. Audio is clear and distinct
(6)	Place audio control panel emergency switch to emergency position. Communicate with all stations	Captain's First Officer's Navigator's	Audio is clear and distinct
(7)	Place audio control panel marker beacon switch up	Captain's First Officer's Navigator's	Applicable station intercommunication system should be isolated from all other stations
(8)	Place audio control panel marker beacon switch down	Captain's First Officer's Navigator's	All stations on interphone
(9)	Place audio control panel normal/emergency switch to down position	Captain's First Officer's Navigator's	Return system to normal operation
(10)	Place audio control panel interphone audio switch in down position and place HF-1 microphone selector switch to HF-1 position	Captain's	When communicating between all other stations captain's audio is isolated from all other stations
(11)	Place audio control panel interphone audio switch in up position and place interphone microphone selector switch to flight interphone position	Captain's	Return captain's station to interphone operation

	Operation	Station/Location	Desired Results
(12)	Repeat step A (10)	First Officer's Navigator's	When communicating between all other stations applicable station audio is isolated from all other stations

B. Test Audio Integrating System Radio

	Operation	Station/Location	Desired Results
(1)	Place audio control panel HF and VHF audio select switches up	Captain's First Officer's Navigator's	To allow operation of applicable radio system
(2)	Place flight/captain's audio/service selector switch to captain's audio	Engineer's	Enable monitoring captain's audio

NOTE: When flight engineer's selector switch is in captain's audio position, any audio selected at the captain's audio control panel will be available at the flight engineer's headset.

	Operation	Station/Location	Desired Results
(3)	In sequence, place audio control panel microphone select switch to each communication position. At each selected position, press microphone push-to-talk button on hand microphones	Captain's First Officer's Navigator's	Audio sidetone output from selected transmitter
(4)	Place all radio selector audio switches up, at audio control panel, one at a time	Captain's First Officer's Navigator's	Audio is present at each switch position from an operating transmitter

AUDIO INTEGRATING - MAINTENANCE PRACTICES

1. General

A. The radio communications systems, radio navigation systems, and all radio receivers must be operating to perform the entire audio integrating system test. If an audio integrating system component, such as a headset or a microphone switch, is replaced, perform the test steps necessary to verify the operation of the component at the affected station. If an audio control panel is replaced perform the entire test at the affected station. If a radio transceiver or receiver is replaced, perform the monitoring for the affected system.

2. Adjustment/Test

A. Test Audio Integrating System Interphone

	Operation	Station/Location	Desired Results
(1)	Place audio control panel microphone selector to interphone, interphone audio switch up, and all other switches down.	Captain's First Officer's Engineer's Navigator's	
(2)	Use hand microphones and headsets to communicate. Vary each volume control.	Captain's First Officer's Engineer's Navigator's	Audio is clear, distinct, and varies smoothly with volume control.
(3)	Place speaker volume control to midposition.	Captain's First Officer's	Respective speaker muted when captain's or first officer's microphone is used.
(4)	Use oxygen mask microphones and push-to-talk switches. Communicate with all stations.	Captain's First Officer's Engineer's Navigator's Observer's	Respective speaker muted when control wheel interphone push-to-talk switches are used. Audio is clear and distinct.
(5)	Adjust speaker audio volume control counterclockwise then clockwise.	Captain's First Officer's	Applicable speaker is off when control is in counterclockwise position.

Operation	Station/Location	Desired Results
(6) Place audio control panel AMP-1/AMP-2 switch to q AMP-2 position. Communicate with all stations.	Captain's First Officer's Engineer's Navigator's	Audio is clèar and distinct.

B. Test Monitor of Communication Transceivers and Navigation Receivers

Operation	Station/Location	Desired Results
(1) Place audio control panel microphone selector and audio select switches to noted positions. VHF-1, VHF-2, HF-1, and HF-2.	Captain's First Officer's Engineer's Navigator's	To allow operation of applicable transceiver.
(2) At noted positions in step B.(1) press push-to-talk button on hand microphones.	Captain's First Officer's Engineer's Navigator's	Audio sidetone output from selected transceiver.
(3) At one position in step B.(1) use oxygen mask microphones.	Captain's First Officer's	Respective speaker muted when control wheel radio push-to-talk switches are used.
(4) At one position in step B.(1) use oxygen mask microphones.	Engineer's Navigator's Observer's	Audio sidetone is clear and distinct when engineer's, navigator's, and observer's push-to-talk switches are used.
(5) Place all radio selector audio switches up at audio control panel, one at a time.	Captain's First Officer's Engineer's Navigator's	Audio is present at each switch position from an operating transmitter.

AUDIO INTEGRATING - MAINTENANCE PRACTICES

1. General

A. The radio communications systems, radio navigation systems, and all radio receivers must be operating to perform the entire audio integrating system test. If an audio integrating system component, such as a headset or a microphone switch, is replaced, perform the test steps necessary to verify the operation of the component at the affected station. If an audio control panel is replaced perform the entire test at the affected station. If a radio transceiver or receiver is replaced, perform the monitoring test for the affected system.

2. Adjustment/Test

A. Test Audio Integrating System Interphone

Operation	Station/Location	Desired Results
(1) Place audio control panel interphone audio switch in up position, all other switches down, and press interphone microphone pushbutton.	Captain's First Officer's System Operator's Navigator's	Monitor interphone audio.
(2) Use hand microphone and headset to communicate. Vary audio control panel volume control.	Captain's First Officer's System Operator's Navigator's	Audio is clear, distinct, and varies smoothly with volume control.
(3) When communicating vary overhead speaker volume control.	Captain's First Officer's	Respective speaker muted when captain or first officer microphone is used. Speaker audio is clear, distinct, and varies smoothly with volume control.
(4) Place audio control panel emergency switch to on position and vary volume control.	Captain's First Officer's System Operator's Navigator's	Headset audio should not vary.
(5) Place emergency switch to off position and release interphone micro-phone bushbutton.	Captain's First Officer's System Operator's Navigator's	

	Operation	Station/Location	Desired Results
(6)	Place jack panel microphone select switch to boom position. Use boomset microphone, control wheel and radio/interphone transfer switch in interphone position, to communicate.	Captain's First Officer's System Operator's Navigator's	Boomset audio is clear and distinct.
(7)	Place microphone select switch to mask position. Use mask microphone, control wheel and radio/interphone transfer switch in interphone position, to communicate.	Captain's First Officer's System Operator's Navigator's	Mask microphone audio is clear and distinct at headset.

B. Test Monitor of Communication Transceivers and Navigation Receivers.

	Operation	Station/Location	Desired Results
(1)	Place audio control panel microphone selector and audio select switches to noted positions. VHF-1, VHF-2, HF-1, HF-2.	Captain's First Officer's System Operator's Navigator's	To allow operation of applicable transceiver.
(2)	At noted positions in step B. (1) press push-to-talk button on hand microphones.	Captain's First Officer's System Operator's Navigator's	Audio sidetone output from selected transceiver.
(3)	Place all radio selector audio switches up, at audio control panel, one at a time.	Captain's First Officer's System Operator's Navigator's	Audio is present at each switch position from an operating transmitter.

AUDIO INTEGRATING - MAINTENANCE PRACTICES

1. General

A. The radio communication systems, radio navigation systems, and the passenger address system must be operating to perform the entire audio integrating system test. If an audio integrating system component, such as a headset or a microphone jack panel, is replaced, perform the test steps necessary to verify the operation of the component at the affected station. If an audio control panel is replaced, perform the entire test at the affected station. If a radio communication system or a radio navigation system component is replaced, perform the monitoring and isolation of radio receiver audio test for the affected system.

2. Adjustment/Test

A. Test Audio Integrating System Interphone

Operation	Station/Location	Desired Results
(1) Place audio control panel radio receiver audio control knobs and switches in off.	Captain's First Officer's Engineer's Navigator's	Isolation of radio receiver audio.
(2) Place passenger address emergency announce switch in off position, or Flight/Service Interphone switch to ISOLATE position.	Aft pedestal	Selection of audio integrating amplifier.
(3) Press interphone microphone selector switch.	Captain's First Officer's Engineer's Navigator's	Microphone output routed to audio integrating amplifier.
(4) Place interphone audio control knob in forward position.	Captain's First Officer's Engineer's Navigator's	Monitoring of audio integrating amplifier outputs.
(5) Place loudspeaker volume controls in CCW.	Captain's First Officer's	Loudspeakers muted.

	Operation	Station/Location	Desired Results
(6)	Place filter switch in off.	Captain's First Officer's Engineer's Navigator's	Bypass filter.

NOTE: Steps (7) through (11) check boomsets, loudspeakers, and associated audio integrating system controls.

	Operation	Station/Location	Desired Results
(7)	Employ boomsets, and place control wheel switches in interphone.	Captain's First Officer's	Boom microphone output routed to audio integrating amplifier.
(8)	Speak into microphone with normal tone. Move interphone audio control knob back and forth, and then set at comfortable level.	Captain's First Officer's	Microphone audio is clear and distinct and varies smoothly with audio control knob travel.
(9)	Speak into microphone at navigator's station and rotate loudspeaker volume control CW and CCW, and then set to full CCW.	Captain's First Officer's	Loudspeaker volume varies smoothly with volume control rotation.
(10)	Place control wheel switch in radio, and speak into microphone with normal tone.	Captain's First Officer's	Microphone audio is clear and distinct.
(11)	Release control wheel switch.	Captain's First Officer's	

NOTE: Steps (12) through (15) check hand microphones, headsets, and associated audio integrating system controls. The headsets are connected in parallel and the hand microphones are connected in parallel at the navigator's station and the observer's station.

	Operation	Station/Location	Desired Results
(12)	Employing hand microphone and headset, press push-to-talk switch and speak into microphone with normal tone.	Captain's First Officer's Navigator's Engineer's Observer's	Microphone outputs routed to audio integrating amplifier.

	Operation	Station/Location	Desired Results
(13)	Move interphone audio control knob back and forth, then set to comfortable level.	Engineer's Navigator's	Microphone audio is clear and distinct and varies smoothly with audio control.
(14)	Place filter switch in on and speak into microphone with normal tone.	Captain's First Officer's Engineer's Observer's	Background noise is inaudible.
(15)	Release push-to-talk switch.	Captain's First Officer's Engineer's Navigator's	

NOTE: Steps (16) through (20) check oxygen mask microphones and associated audio integrating system controls.

	Operation	Station/Location	Desired Results
(16)	Employing oxygen mask microphone and headset, place control wheel switch to interphone.	Captain's First Officer's	Route microphone outputs to audio integrating amplifier.
(17)	Speak into microphone with normal tone.	Captain's First Officer's	Microphone audio is clear and distinct.
(18)	Release control wheel switch.	Captain's First Officer's	End oxygen mask microphone check.
(19)	Employing oxygen mask microphone and headset, depress push-to-talk switch.	Engineer's Navigator's	Microphone outputs routed to audio integrating amplifier.
(20)	Speak into microphone with normal tone.	Engineer's Navigator's	Microphone audio is clear and distinct.
(21)	Release push-to-talk switch.	Engineer's Navigator's	

B. Test Monitoring of Radio Receiver Audio and Isolation of Stations

Operation	Station/Location	Desired Results
(1) Place audio control panel radio receiver audio control knobs and switches in off.	Captain's First Officer's Engineer's Navigator's	Isolation of radio receiver audio
(2) Depress interphone microphone selector switch.	Captain's First Officer's Engineer's Navigator's	Any interference routed to audio integrating amplifier.
(3) Place interphone audio control knob in mid-position.	Captain's First Officer's Engineer's Navigator's	Monitoring of audio integrating amplifier.
(4) Place loudspeaker volume control in full CCW.	Captain's Flight Officer's Engineer's Navigator's	Loudspeaker muted.
(5) Select local channels on VHF-1, VHF-2, HF-1, HF-2, VHF/NAV-1, VHF/NAV-2, ADF-1, and ADF-2.	Respective selector panels	Audio output from all audio receivers.

NOTE: Employ headset to monitor radio receiver audio. While testing the monitoring at one station, monitor at least one other station to verify isolation.

Operation	Station/Location	Desired Results
(6) Move each audio control panel audio control knob forward and then to off.	Captain's First Officer's Engineer's Navigator's	Each system audio varies smoothly with audio control knob travel and audio is not detected at any other station.
(7) Place ADF-1 and ADF-2 switches in on and then in off.	Captain's First Officer's Engineer's Navigator's	Each receiver audio is present.